TC-K790ES

SERVICE MANUAL

AEP Model

Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen. "DOLBY", the double-D symbol ⧈ and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

Model Name Using Similar Mecanism	TC-K770ES
Tape Transport Mechanism Type	TCM-200D9

SPECIFICATIONS

Recording system — 4-track 2-channel stereo
Fast winding time — Approx. 90 sec. (with Sony C-60 cassette)
Bias — AC bias
Heads — Erasing head × 1 (S&F head)
Recording head × 1 (Permalloy head)
Playback head × 1 (Permalloy head)
Motors — Capstan motor × 1 (direct drive linear torque BSL motor)
Reel motor × 1 (DC motor)

Signal-to-noise ratio (at peak level)

Cassette (Dolby NR OFF)	Type IV (Sony Metal-S)	Type II (Sony UX-S)	Type I (Sony HF-S)
	61 dB	59 dB	57 dB

Measured at peak level weithted without NR. The S/N is improved by about 15 dB at 500 Hz and by about 20 dB about 1 kHz with Dolby-C NR on, and by 5 dB at 1 kHz and by 10 dB about 5 kHz with DolbyB-NR on.

Harmonic distortion — 1.5% (with Sony Metal-S 250 nWb/m, 315Hz, 3rd H.D.)

Frequency response (Dolby NR OFF)

Type IV cassette (Sony Metal-S)	20 - 21,000 Hz (±3 dB, IEC) 20 - 16,000 Hz [±3 dB (-4 dB recording)]
Type II cassette (Sony UX-S)	20 - 19,000 Hz (±3 dB, IEC)
Type I cassette (Sony HF-S)	20 - 17,000 Hz (±3 dB, IEC)

Wow and flutter — ± 0.05% W.Peak (IEC)
0.025% W.RMS (NAB)
± 0.07% W.Peak (DIN)

Inputs

Line inputs (phono jacks)	Sensitivity	0.16V
	Input impedance	47 k ohms
CD DIRECT INPUT	Input impedance	47 k ohms

Outputs

Line outputs (phono jacks)	Rated output level	0.5 V at a load impedance of 47 k ohms
	Load impedance	Over 10 k ohms
Headphones (stereo phone jack)	Output level	0 - 3 mW at a load impedance of 32 ohms

General

Power requirements — 220 - 230 V AC, (or 240 V AC adjustable by Sony personnel), 50/60 Hz
Power consumption — 23 W
Dimensions — Approx. 430 × 135 × 350 mm (w/h/d) (17 × 5⅜ × 13⅞ inches) including projecting parts and controls
Weight — Approx. 6.9 kg (15 lbs 4 oz)
Supplied accessories — Audio connecting cords (2)

Design and specifications are subject to change without notice.

MICROFILM

STEREO CASSETTE DECK

SONY®

TABLE OF CONTENTS

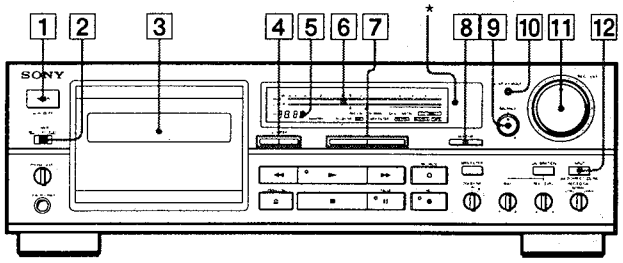
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1
GENERAL

This section is extracted from instruction manual.

Identifying the Parts

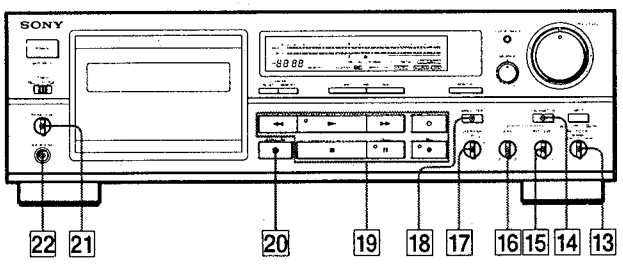


Front Panel

For details, refer to the page number indicated in parenthesis .

1 POWER switch
2 TIMER switch (50)
3 Cassette holder
4 Counter buttons
RESET button (26)
MEMORY button (24, 26)
5 LINEAR COUNTER (26)
6 PEAK PROGRAM METER (32)
7 AMS (Automatic Music Sensor) buttons (22)
8 MONITOR button (34)
9 BALANCE control (28)
10 DISPLAY MODE button (18)
11 REC (recording) LEVEL control (28, 32)
12 INPUT button (28)

* Remote control sensor
You can remotely control this cassette deck with:
— A remote commander that came with a Sony amplifier or receiver if it has the R mark and cassette deck control capability.
— An optional Sony remote commander with the R mark and cassette deck control capability.



13 REC EQ CAL (recording equalizing calibration) switch (LOW, NORMAL, HIGH) (42)
14 CALIBRATION button (40)
15 REC (recording) LEVEL control for calibration (36, 40)
16 BIAS control (36, 40)
17 DOLBY NR (noise reduction) switch (18, 28)
18 MPX FILTER button (32)
19 Tape operation buttons and indicators
◄◄ (rewind) button
■ (stop) button
► (play) button and indicator
►► (fast-forward) button
● REC (recording) button and indicator
II PAUSE button and indicator
O REC MUTE (record muting) button (48)
20 ≜ OPEN/CLOSE button
21 PHONE (headphones) LEVEL control
22 HEADPHONES jack (stereo phone jack) (20)

Recording

Recording FM Broadcasts with the Dolby NR System

When recording FM broadcasts with the Dolby NR system, set the MPX FILTER button to ON (the "FILTER" indicator appears).
The MPX filter eliminates remnants of the 19-kHz stereo carrier and 38-kHz subcarrier signals which may impair the operation of the DOLBY NR system. Be sure that the Dolby NR switch is turned on since the MPX filter will not function otherwise. During recording with the Dolby NR system, use this switch only if the tuner is not equipped with its own MPX filter or the equipped filter does not function effectively.

Adjusting the Recording Level

The optimum recording level, which differs according to the tape type, is indicated on the PEAK PROGRAM METER for each tape type.
Adjust the REC LEVEL control as high as possible without exceeding the recommended range for the tape type being used.

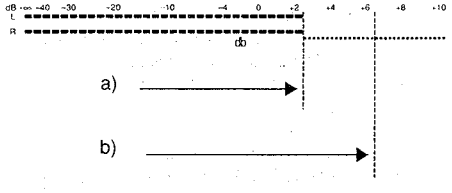
PEAK PROGRAM METER recording by tape type

Fig. **A** shows the recommended maximum PEAK PROGRAM METER readings.
a) for Type I (normal) or Type II (CrO_2) tape
b) for Type IV (metal) tape

Tips on recording level adjustment

- If the recording level setting is too high, the recording will be distorted; if it is too low, the tape will produce a hissing sound. Therefore, the recording level should be set as high as possible without causing distortion.
- If the program source to be recorded has many high frequency signals, set the level to a relatively low position.

A



Monitoring the Recorded Sound

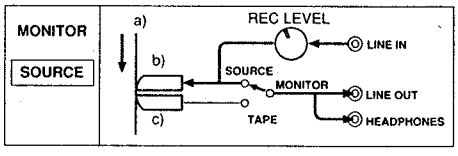
As this unit has three separate heads for recording, playback and erasure, you can check the quality of a recorded sound by comparing it with the input source signal.

To listen to the input source signal, set the MONITOR button to SOURCE. (Fig. **A**)
To listen to the sound recorded on the tape, set the MONITOR button to TAPE. (Fig. **B**)
Fig. **A** and **B** show the MONITOR button setting and their respective signal flow.
a) Band
b) Recording head
c) Playback head

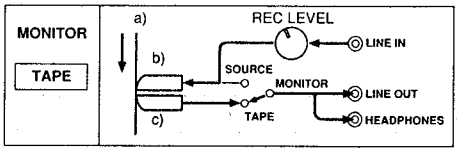
Comparing the recorded sound with the sound source

While recording, use this monitoring function to check that there is no distortion due to excessive level settings or sound degradation due to head contamination.

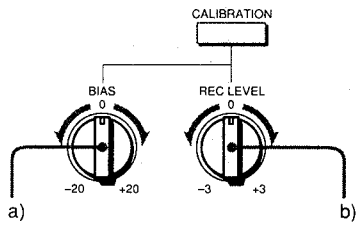
A



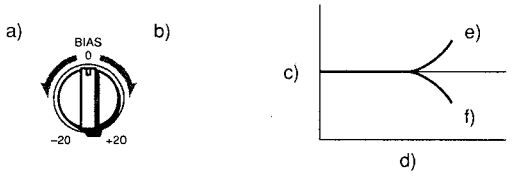
B



A



B



Making an Optimum Recording

Bias and Recording Level Calibration

There are many different types of cassettes on the market, each with varying magnetic properties. Although your unit is equipped with the ATS (Automatic Tape Selection) system which sets the appropriate equalization characteristics and bias current for each tape type, an additional calibration adjustment can often produce even better results. Use the bias current and recording level calibration function to obtain the optimum recording conditions for your tape.

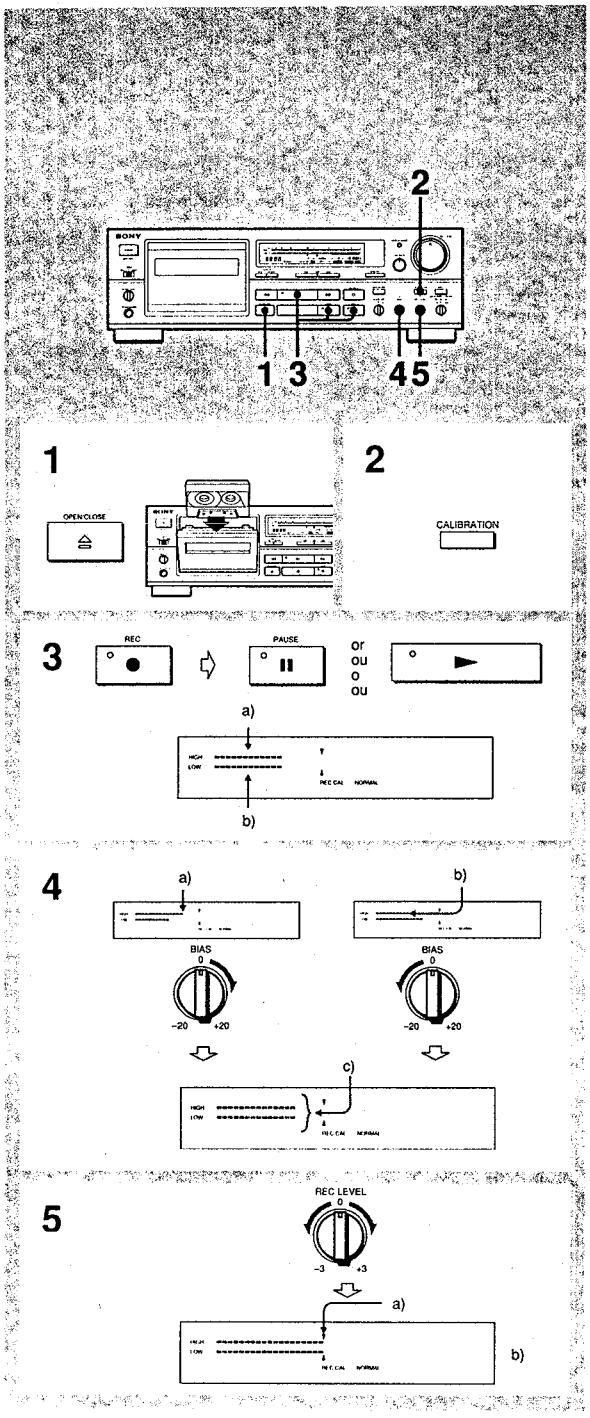
Fig. A shows the BIAS control and REC (recording) LEVEL control for calibration.
a) Adjusts bias current within ±20%
b) Adjusts recording level within ±3 dB

Bias calibration

Choosing the optimum bias current for a tape ensures minimum distortion and flat frequency response. Lowering the bias current boosts high-frequency response, but also results in higher distortion. Raising the bias, on the other hand, reduces distortion, but also dampens high-frequency response. Optimum bias is thus obtained when the bias current and high-frequency response are well balanced.

Fig. B shows the BIAS control and a high-frequency response balance chart.
a) High-frequency response rises
b) High-frequency response drops
c) Output (level in dB)
d) Frequency in Hz
e) Bias reduced (–)
f) Bias increased (+)

(Continued on next page.)



40

Making an Optimum Recording

1 Insert the cassette to be used for recording.

2 Press CALIBRATION.

3 Press ●, then ❚❚ or ► to activate the recording test tone.

a) Playback level for an 8-kHz signal
b) Playback level for a 400-Hz signal

Note

- The sound cannot be monitored during the calibration operation.
- It takes 2 to 3 seconds for the test tone level to stabilize.

4 Adjust BIAS until both meters indicate equal playback levels.

a) A high reading on the upper meter indicates a low bias current.
b) A low reading on the upper meter indicates a high bias current.
c) An equal reading on both meters indicates the optimum bias current condition.

5 Adjust REC LEVEL CALIBRATION until both meters reach the recommended level (REC CAL).

a) Recommended level
b) The bias current is now adjusted to the optimum level and the tape sensitivity compensation has been set. Press ■, then set CALIBRATION to OFF. Rewind the tape and start the actual recording.

Recording Equalization Calibration

Although bias currrent and equalization are automatically set by the Automatic Tape Selection (ATS) function for the tape being used, you can use the REC EQ CAL switch to change the recording characteristics according to the nature of the source material or to compensate for the particular characteristics of the tape.

Fig. A shows the REC EQ CAL switch.
a) To emphasize higher frequencies in recordings
b) For normal recordings
c) To dampen higher frequencies in recordings

Bias Calibration Recording

Use the REC EQ CAL switch in conjunction with the BIAS control to modify bands of sound and record according to the tape's characteristics.

- **When recording music which has strong middle and low frequencies**
  Set the bias at flat with the REC EQ CAL switch set in the HIGH position to increase the bias current.
  Adjust the BIAS control so that the HIGH and LOW meters indicate equal readings.

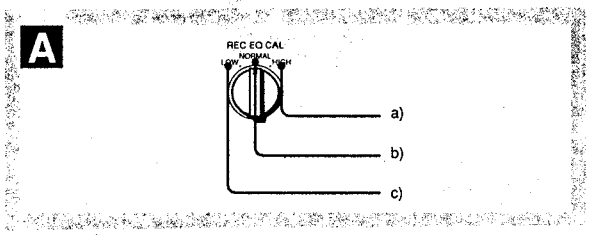
- **When recording music which has strong high frequencies**
  Set the bias at flat with the REC EQ CAL switch set in the LOW position to decrease the bias current.
  Adjust the BIAS control so that the HIGH and LOW meters indicate equal readings.

Note

With metal tape, because the amount of frequency characteristic modulation is not in proportion to that of the bias, the optimum bias current may not be obtained using the methods above.

Another use of the REC EQ CAL switch

When using special tapes, adjusting the BIAS control with the REC EQ CAL switch set in the NORMAL position may not result in equal readings on the HIGH and LOW meters. If this occurs, adjust the BIAS control after setting the REC EQ CAL switch to HIGH or LOW.



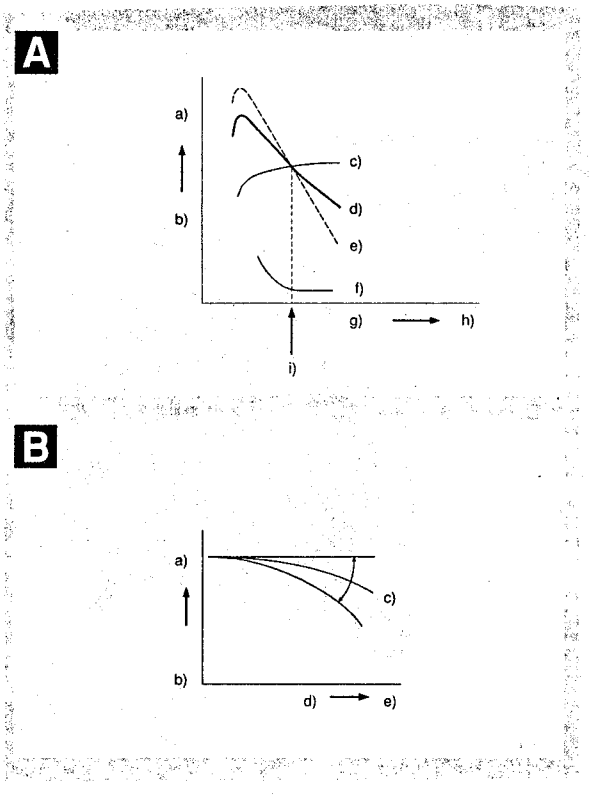
Recording

What is the Dolby HX PRO System?

The Dolby HX PRO system provides improved linearity in high-range frequency response during recording. Tapes recorded with this system retain the same high quality even when played back on other tape decks.
As shown in Fig. A , characteristics such as output level and distortion differ widely according to the bias (high-frequency) current.
Fig. A .
a) High
b) Distortion output
c) 315 Hz
d) 6.3 kHz
e) 10 kHz
f) 315 Hz distortion
g) Bias current
h) High
i) Established bias current

In conventional systems (see Fig. B), the bias current is susceptible to variations in certain recording signals which may cause fluctuations in frequency response, distortion, or other unwanted characteristics.
Fig. B .
a) High
b) Output
c) Fluctuation
d) Frequency
e) High

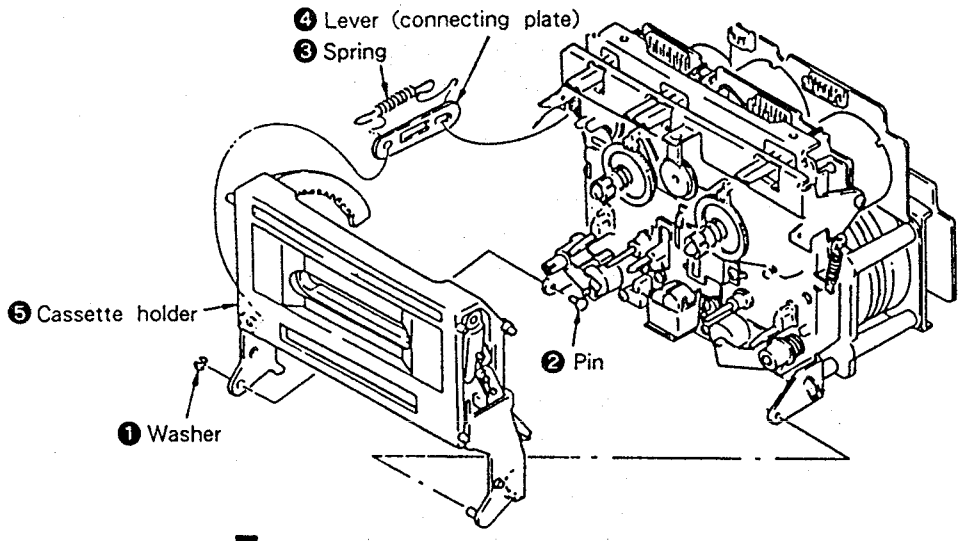
With the Dolby HX PRO system, the effective bias amount added to the bias current is controlled in millisecond units to greatly reduce distortion, improving linearity in high-range response and ensuring high-intensity recording with minimal distortion and noise.



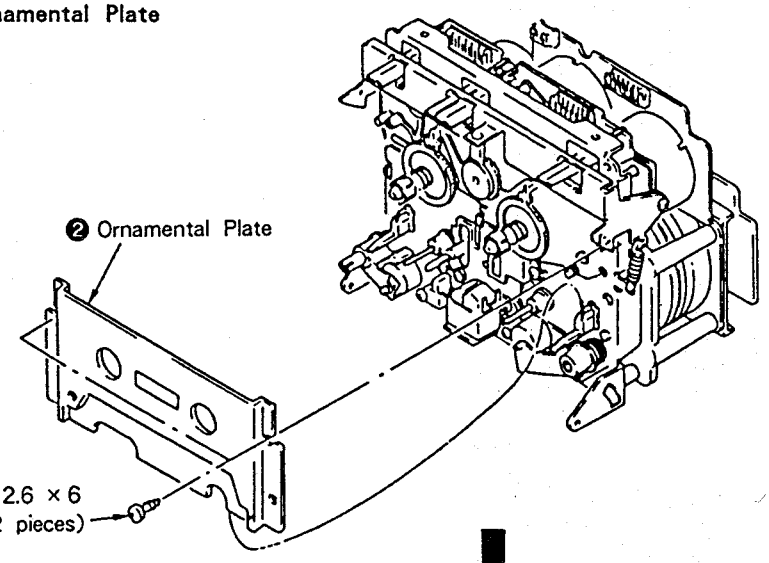
SECTION 2
DISASSEMBLY

• If the parts are marked with the numbers ❶, etc., remove them in the order of the number.

Cassette Holder

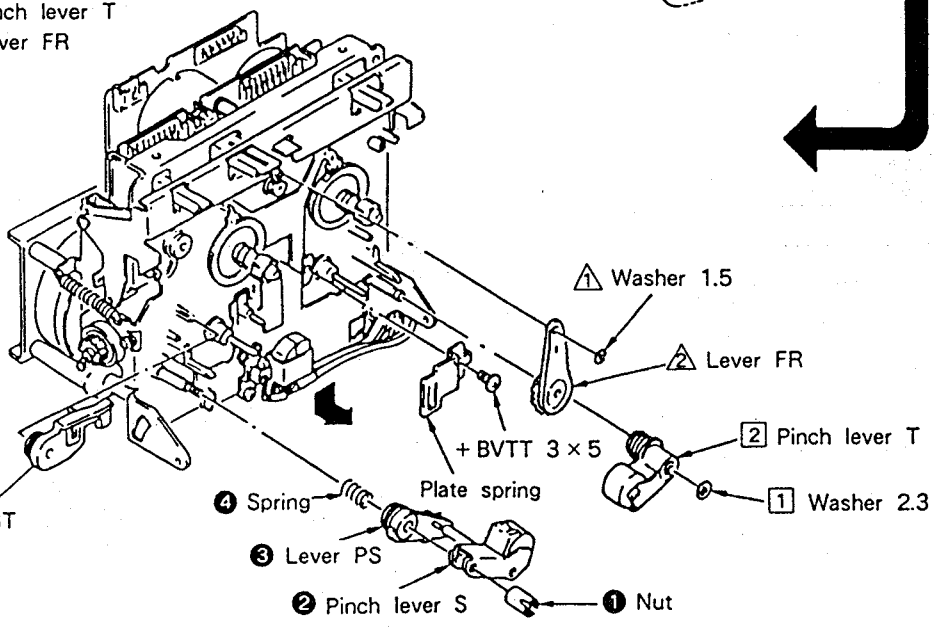


Ornamental Plate



Pinch Lever/Lever FR

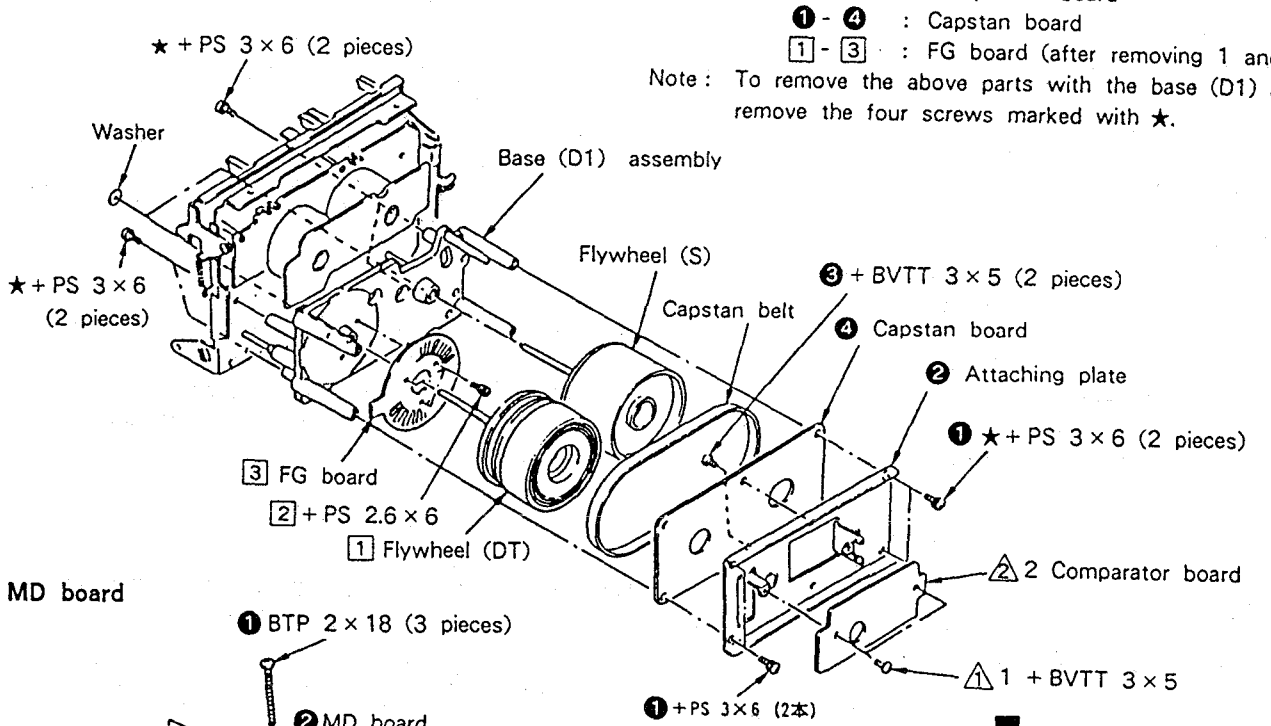
❶- ❹ : Pinch lever S
[1] and [2] : Pinch lever T
△1 and △2 : Lever FR



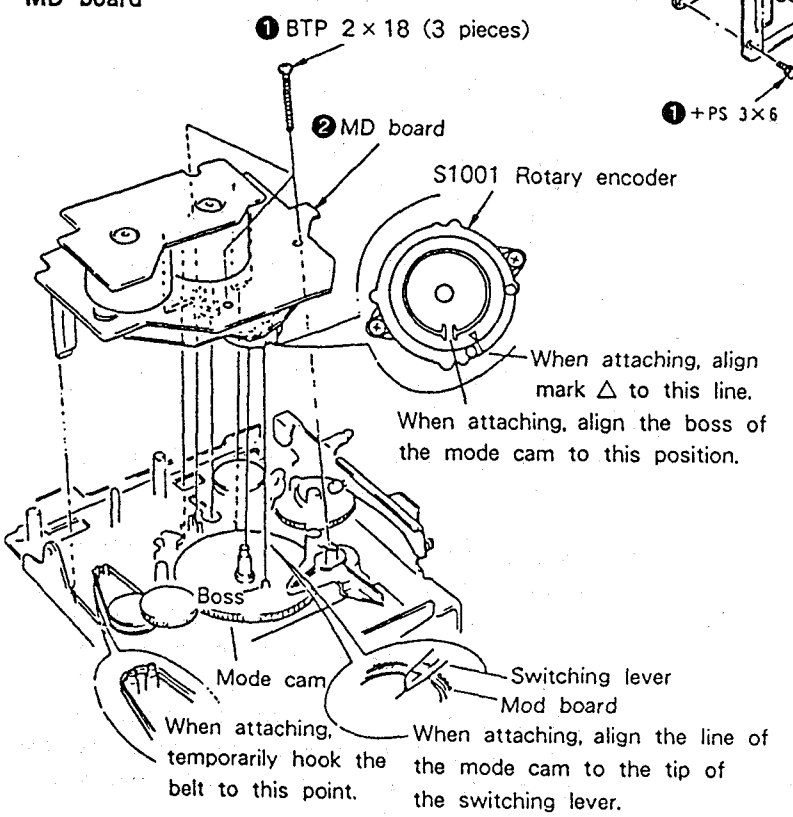
Comparator Board/Capstan Board/Flywheel/FG Board

△1 and △2 : Comparator board
❶ - ❹ : Capstan board
[1] - [3] : FG board (after removing 1 and 2)

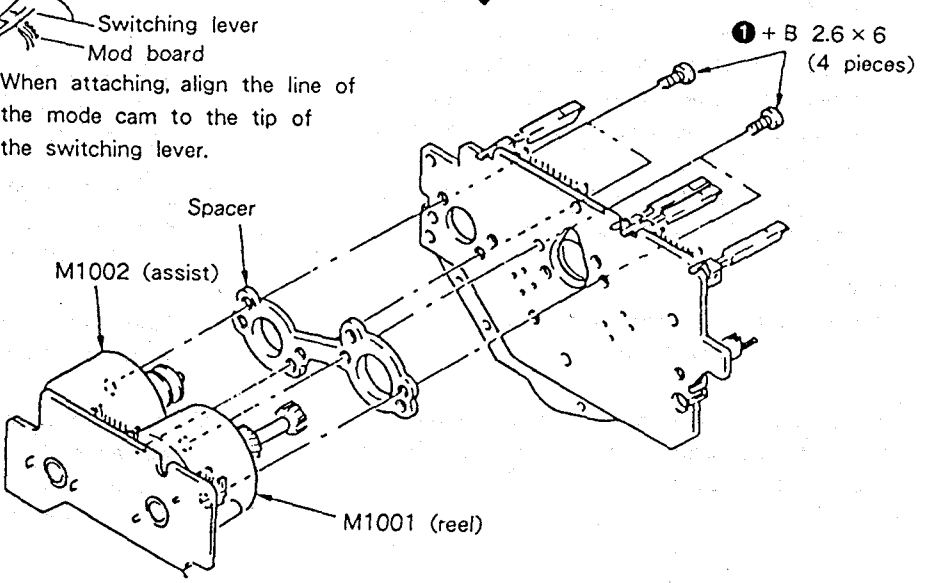
Note : To remove the above parts with the base (D1) assembly, remove the four screws marked with ★.



MD board



Reel Motor Board

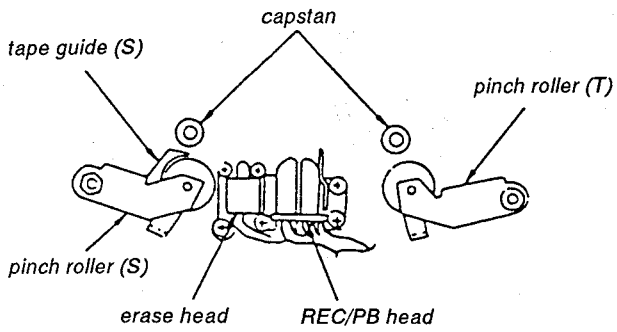


SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab :
   record/playback head, pinch roller, erase head, rubber belts, capstan, idlers
2. Demagnetize the record/playback and erase head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.



Tape Path Adjustment

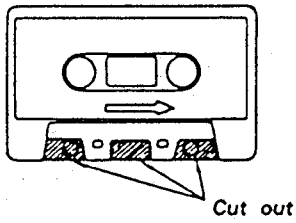
• Refer to Adjustment Position on page 12.

Note : When using the adjustment methods for other than replacement reasons, please do not tamper unnecessarily with the adjustment screws or the erasehead because either the supply pinch roller guide or the record/playback head will be made the standard tape paths. Moreover, when it is necessary to adjust and replace two or more of any of the heads and/or pinch rollers, replace them one by one, completely taking out the first tape path, and then replacing the second one.

Preparation :

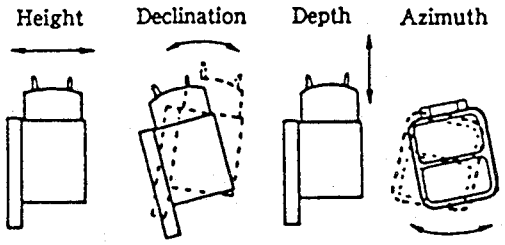
1. Mirror cassette CQ009C 8-909-708-01
   (or CQ012C 8-909-708-02)

   If one does not have this, cut out the sections of a 120-minute cassette shell as indicated below and use that cassette.



2. Phillips screwdriver (medium-size) :
   For the head adjustment screws
   Blade-type screwdriver (large-size) :
   For the supply pinch roller adjustment screws
3. Pen light
4. WS-48B (3 kHz, 0 dB)
5. P-4-A100 (10 kHz, -10 dB)

Definition of Terms : The figures are of a record/playback head.



Adjustment Method :

Supply Pinch Roller

Note : Only perform this adjustment when the supply pinch roller is to be replaced.

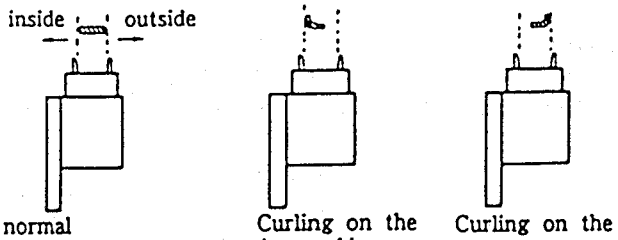
1. Insert the mirror cassette and put the unit in record/playback mode.
2. Check to see whether the tape is curling at the record/playback head guide or the pinch roller guide.
   If it is curling, remove the curl by adjusting the ⓒ tape curl adjustment screw. Then, check that the tape is running past the middle of the erasehead.

Record/playback Head

Note : Only perfom this adjustment when the record/playback head is to be replaced.

1. Insert the mirror cassette and put the unit in record/playback mode.
2. **(Height Adjustment)** Check to see if the tape is curling at the tape guide of the head. If it is curling, tighten screws Ⓐ, Ⓑ, and Ⓒ, respectively by the same angle, moving the head so that it

remains at the same angle throughout the procedure. If it curls on the bottom side of the mirror cassette (actually the inner side), tighten all the screws equally ; but loosen them if the tape begins to curl on the top side (outer side).



normal (record/playback head as seen from the side of the erasehead.)

Curling on the inner side. Tighten screws Ⓐ, Ⓑ, and Ⓒ.

Curling on the outer side. Loosen screws Ⓐ, Ⓑ, and Ⓒ.

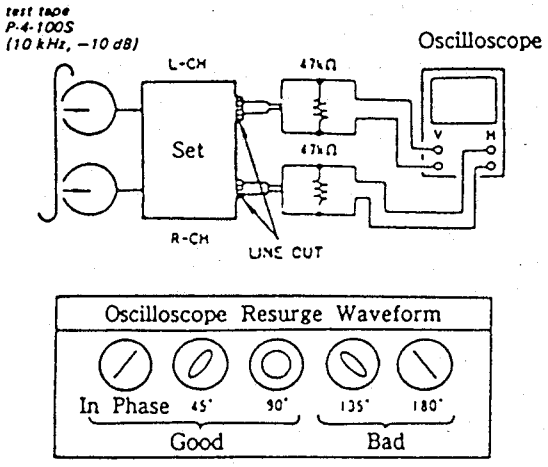
3. **(Declination Adjustment)** While in the record/playback position, set the back tension to 0 (wind the supply reel with something thin like a pencil in a counterclockwise direction) and make sure there is no curling or shifting (shifting up/shifting down) at the guide of the record/playback head.

   Because shifting can only occur due to a difference in the width of the tape and that of the tape guides (curling will otherwise occur), it is necessary to pay close attention since it can be easily overlooked. When there is a shift, tighten screws Ⓑ and Ⓒ equally and change the declination of the head. If the tape is shifting up, tighten the screws, and if it is shifting down, loosen them.

4. Repeat the adjustments in steps 2 and 3 and fine adjust the height and the declination.

5. **(Preliminary Azimuth Adjustment)**
   After demagnetizing and cleaning the adjustment head, play back WS-48B (3 kHz, 0 dB).
   Turn screw Ⓒ so that the reading on the level meter of the unit or that of the level meter connected to LINE OUT is maximized.
   If the screw is turned at least half a revolution, repeat the adjustments from step 1.

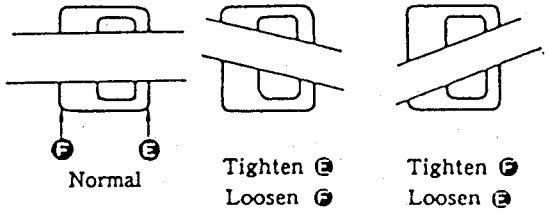
6. **(Tape Path Check)** Connect the oscilloscope to LINE OUT and play back P-4-A100 (10 kHz, -10 dB) to display a resurge waveform. After 20 seconds of record/playback (after the tension within the loop has been increased sufficiently), make sure the variation in the resurge is within ± 90 degrees (within ± 45 degrees is desired). If the variation is greater than this, it is because the declination and/or the height adjustment is not perfect. Repeat the adjustments from step 1.



Erasehead

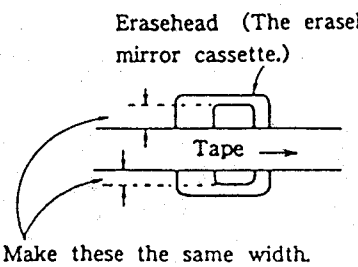
Note : Only perform this adjustment when the erasehead is to be replaced.

1. Insert the mirror cassette and put the unit in record/playback mode.
2. **(Azimuth Adjustment)** Adjust the azimuth of the erasehead by adjusting screws Ⓔ and Ⓕ so that the tape runs as evenly as possible.



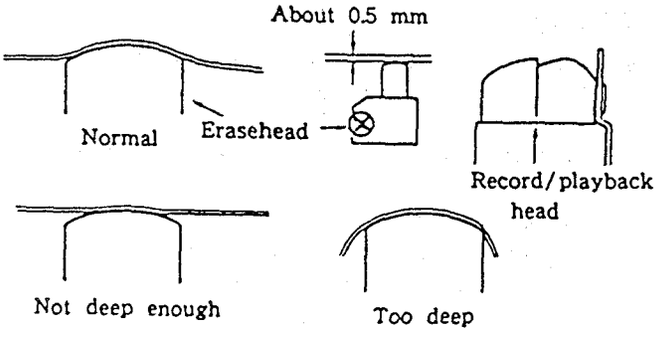
(The erasehead as seen when erasing the mirror cassette.)

3. **(Height adjustment)** Turn screws Ⓓ, Ⓔ, and Ⓕ all by the same angle so that the portions of the erasehead visible at top and bottom are nearly of equal width. If the width at the top is greater, tighten the screws ; if the width at the bottom is greater, loosen the screws.



Make these the same width.

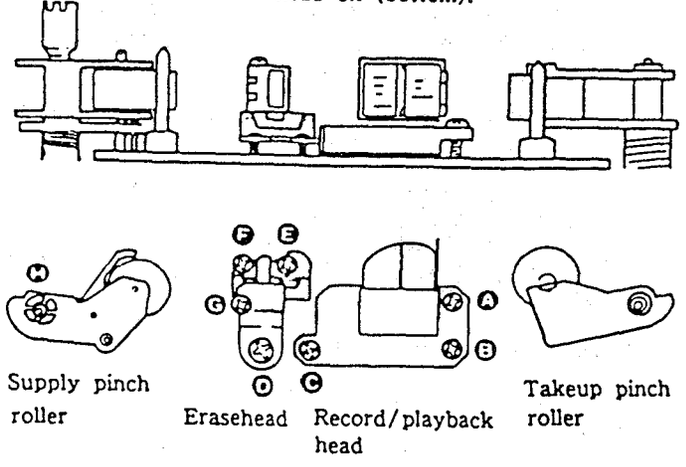
4. (**Declination Adjustment**) Leaving it in the playback position, put the back tension to 0 and make certain the erasehead part and supply pinch roller guide part do not shift. If there is a shift, turn the screw Ⓓ and change the declination. Looking at it using the mirror cassette, if the tape shifts up, tighten the screw, and if it shifts down, loosen the screw.
5. Repeat the adjustments beginning with step 2 and fine adjust the height and declination. And make sure the tape does not curl up on the pinch roller guide or the guide part of the record/playback head.
6. **(Depth Adjustment)** In order to make the entire head play the tape smoothly, and to make sure the depth of the erasehead is neither too shallow nor too deep, loosen screw Ⓖ a bit.



Check

1. Check to make sure that there are no curls or shifts throughout the whole tape path and that the tape runs smoothly.
2. Reapply the locking compound to the adjusted screws. (The locking compound should only be applied to screw Ⓖ after the azimuth has been adjusted.)

Adjustment Position : As seen from the cassette, side (top) and MD as seen head on (bottom).



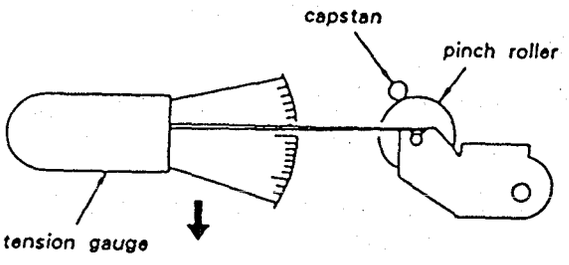
Pinch Roller Pressing Force Measurement

Mode : playback

Hook needle of the tension gauge to the pinch roller shaft and push back pinch roller to detach it from capstan. Then, return it gradually to capstan and read the gauge when the pinch roller begins turnning.

Standard Limits :

Tape-up side : 270 – 350g (9.5 – 12oz)
Supply side : 180 – 280g (6.4 – 9.9oz)



3-2. ELECTRICAL ADJUSTMENTS

Note : The adjustment should be performed in the order given in this service manual.
The adjustments should be performed for both L-CH and R-CH.

- Simultaneous REC/PB Mode :
  Input the signals to LINE IN terminal and set to REC mode. Set the monitor switch to TAPE, and monitor the recorded signal for LINE OUT terminal.

- Switch Position :
  DOLBY NR ····· OFF
  TIMER ····· OFF
  MONITOR ····· TAPE
  HX PRO ····· OFF
  CALIBRATION ····· OFF
  CD DIRECT ····· OFF
  BIAS ····· CENTER CLICK
  REC LEVEL ····· CENTER CLICK

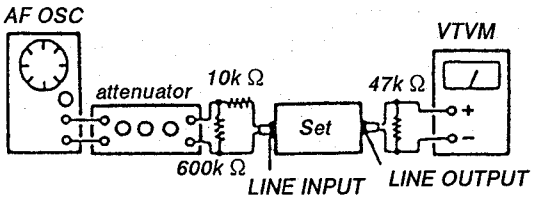
- Standard Record :
  Deliver the standard input signal level to the input jack and set the REC LEVEL control to obtain the standard output signal level.

Standard Input Level

Input Terminal	LINE IN
source impedance	10 kΩ
input level	0.25 V (−10 dB)

Standard Output Level

Output Terminal	LINEOUT
load impedance	47 kΩ
output level	0.44 V (−5 dB)



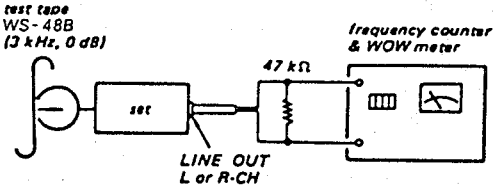
Torque Adjustment and Measurement

1. Insert a tape for torque measurement, CQ-102C, and put the set to PLAY mode. Adjust RV801 so that the reading of the torque meter is 40 ± 3g.cm.
2. After the adjustment, measure the back-tension and the FF/REW torque and check that the following specifications are satisfied.

Torque	Torque Meter	Reading
FWD	CQ-102C	35 – 45g • cm (0.49 – 0.62oz • inch)
FWD Back tension	CQ-102C	7 – 11g • cm (0.097 – 0.15oz • inch)
FF/REW	CQ-201B	65 – 90g • cm (0.9 – 1.4oz • inch)

Tape Speed/WOW Check

Procedure:

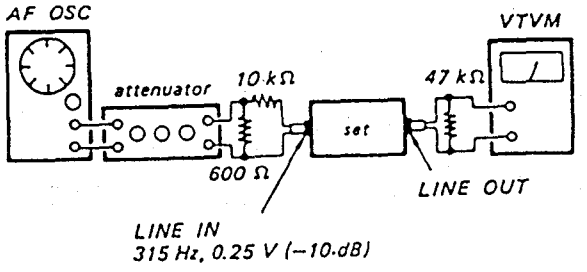


1. Measure the output frequency and the WOW value while playing back the tape top of the test tape.
2. Turn over the test tape, measure the output frequency and the WOW value, and check the difference from the values of the step 1.

Adjustment Limits :
TAPE SPEED deviation : within 2,985 to 3,015Hz
WOW (WRMS) : 0.05% or less

MPX FILTER Check
Setting : DOLBY switch : OFF
MPX FILTER switch : OFF

Procedure :
1. Mode: stop

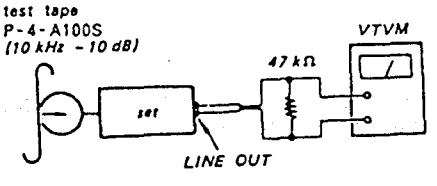


2. Apply 315Hz, 0.25V (−10dB) signal and adjust REC LEVEL (RV502) control so that the LINE OUT level is 0.44V (−5dB).
3. Apply 19kHz 0.25V (−10dB) signal and confirm that the LINE OUT level is 0.013V (−35dB) or less.

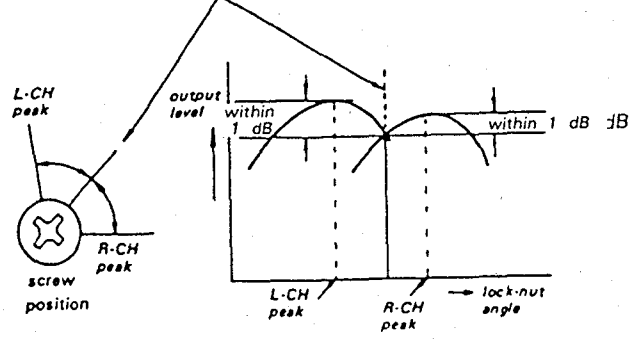
Adjustment Limits :
DOLBY NR switch : B or C
MPX FILTER switch : Line output level when ON.
315Hz : Within 0.49 to 0.39V (within −4dB to −6dB)
19kHz : 0.013V (−35dB) or less

Record/Playback Head Azimuth Adjustment

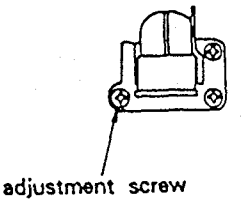
Procedure :
1. Mode : playback



2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until doth of output levels match together within 1dB.

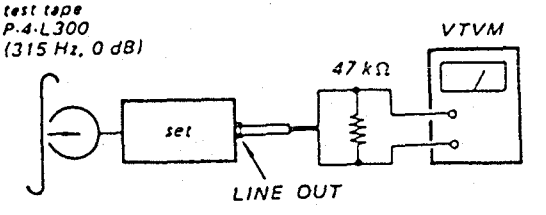


Adjustment Location :



Playback Level Adjustment

Procedure:
1. Mode : playback

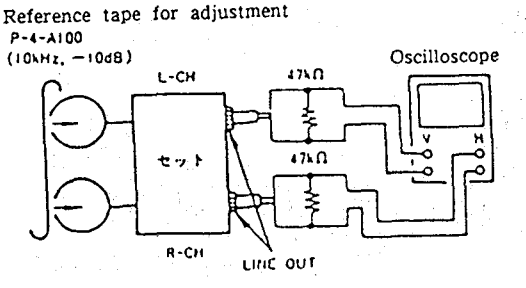


Adjust RV101 (L-CH) and RV201 (R-CH) to obtain the specified LINE OUT level.

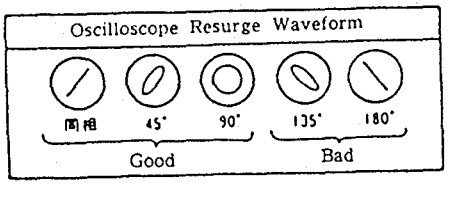
Adjustment Limits :
LINE OUT level : 0.338 to 0.301 V
(−7.2 to −8.2 dB)
Level difference between channels :
less than 0.5 dB

Check that the LINE OUT level does not change in playback mode while changing the mode from playback to stop several times.

3. Phase check
− Play mode −

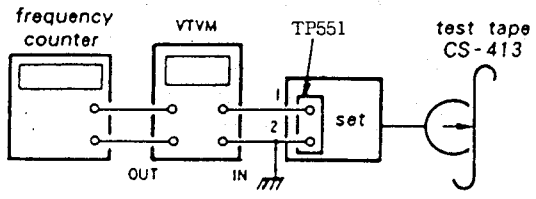


4. Check that the phase difference between L-ch and R-ch is within 0 ~ (same to 90°).



Erase Current Adjustment

1. Mode : record



2. Adjust RV553 so that the reading on VTVM is 110mV (erase current = 110mA).
3. And then confirm that the reading on the frequency counter is 160kHz.

Adjustment Limits :

Erase current : 105mA to 110mA
Frequency : 160 ± 6kHz

Bias Current Adjustment

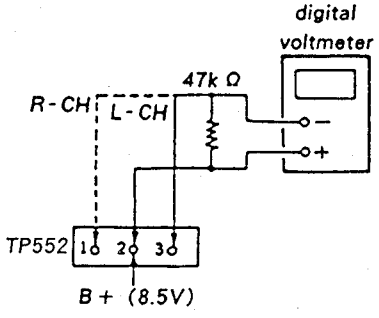
Note : This adjustment should be made before Record Bias Adjustment.

Procedure :

1. Preset RV303 (L-CH) and RV403 (R-CH) and RV554 in the center position, and record with no signal.
2. Adjust T401 (L-CH) and T301 (R-CH) for minimum readings on the digital voltmeter.

Adjustment Limits :

120mV or less. (reference)



CrO_2 Bias and Record Level Adjustment

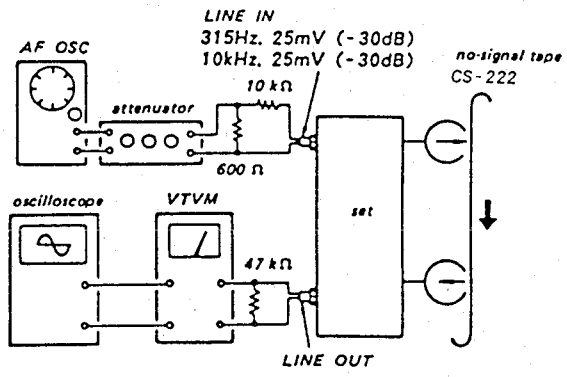
Note : This adjustment should be made before Record Bias Adjustment.

Setting:

REC LEVEL knob: standard record position
(See page 13.)

Procedure:

1. Mode: simultaneous REC/PB



2. Adjust RV403 (L-CH) and RV303 (R-CH) so that the playback output level of 10kHz signal is 0.3dB − 0.3dB with respect to that of 315Hz. • • • Record Bias Adjustment.
3. Adjust RV401 (L-CH) and RV301 (R-CH) so that the playback output level of 315kHz is − 25.3dB to − 24.7dB. • • • Record Level Adjustment.

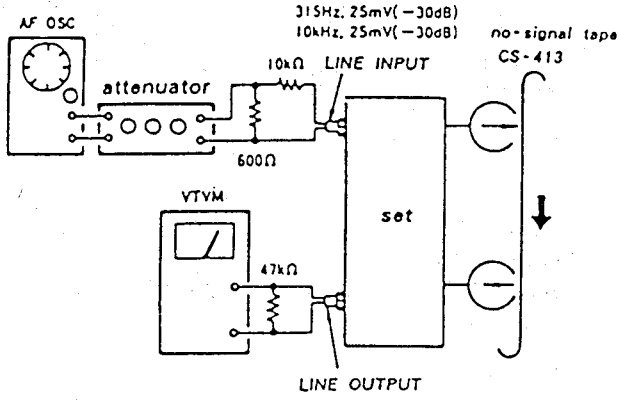
Metal Bias Adjustment

Setting :

REC LEVEL Knob : standard record position
(See page 13.)

Procedure :

1. Mode : simultaneous REC/PB



2. Adjust RV554 so that the difference between the playback output at 315Hz and that of 10kHz in R-CH is within 0.3 dB to − 0.3dB.

Normal Bias Adjustment

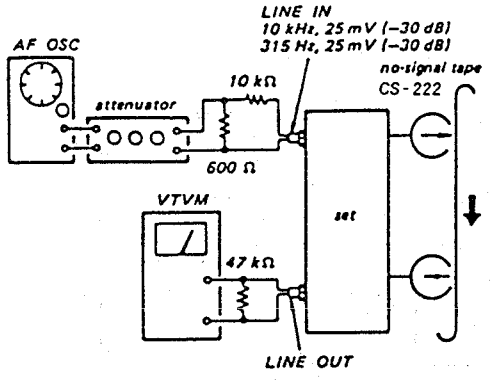
Setting:

REC LEVEL knob: standard record position

(See page 13.)

Procedure:

1. Mode: simultaneous REC/PB



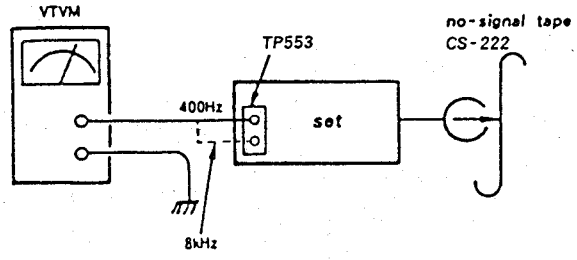
2. Adjust RV302 (L-CH) and RV402 (R-CH) so that the difference between the playback output at 315Hz and that of 10kHz in R-CH is within 0.3dB to −0.3dB.
3. Set the HXPRO switch to OFF.
4. Adjust RV104 (L-CH) and RV204 (R-CH) so that the difference between the playback output at 10kHz when the HXPRO is ON and that of 10kHz when ON is within 0.5dB to −0.5dB.

Calibration OSC and Calibration Meter Adjustment

Setting : CALBRATION switch : ON

Procedure (OSC OUT LEVEL) :

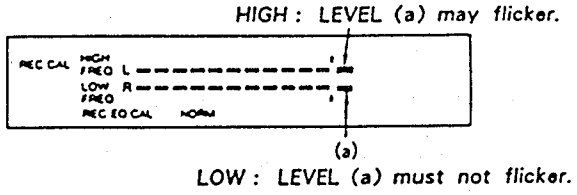
1. Mode : record (no-signal (LINE INPUT))



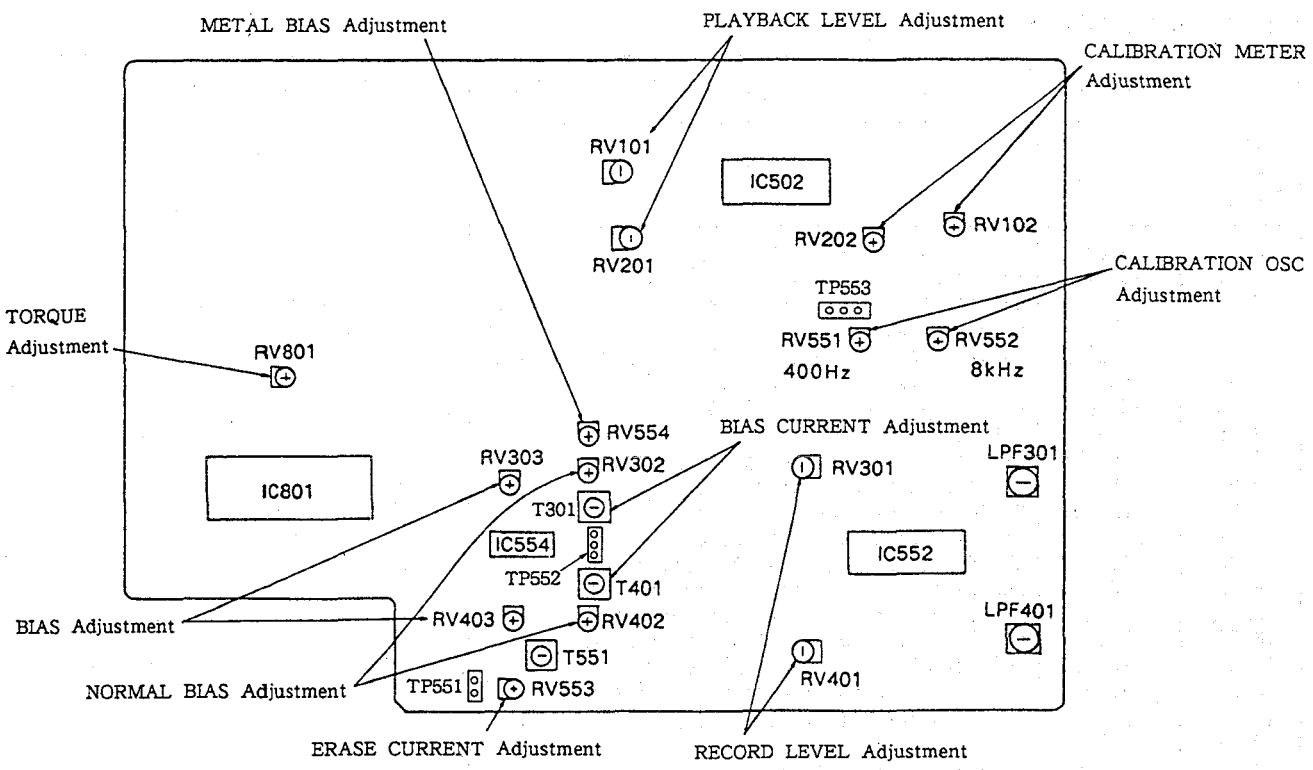
2. Adjust RV551 so that a check-point level at 400Hz is 95dB to 10.5dB.
3. Adjust RV552 so that a check-point level at 8kHz is 9.5dB to 10.5dB.

Procedure (CAL METER ADJ) :

1. Put the set in record mode and adjust RV202 (HIGH) so that HIGH FREQ segments in the CAL LEVEL meter light thoroughly up to 0 VU as shown in the figure below. Segment (a) may flicker.
2. Preset RV102 (LOW) so that segment (a) in LOW FREQ CAL LEVEL meter lights. Then adjust RV102 to the point where segment (a) goes out.



Adjustment Location : MAIN (A) BOARD (COMPONENT SIDE)



SECTION 4
DIAGRAMS

4-1. DESCRIPTION ON IC

IC502, IC552 (CX20188)

An electronic switch circuit for the operation mode control is included. Controls are performed by adding direct current voltages VH, VM, and VL to Dolby OFF/B/C and calibration/REC/Playback terminals.

CX20188 Pin No.	Pin name	Description
1.	Vcc	Positive power supply terminal.
2, 41.	REC IN	Recording input terminal.
3.	I REF	Reference current input terminal.
4, 39.	PB IN	Playback input terminal.
5.	CAL/REC/PB	Calibration/recording/playback select terminal
6, 37.	PB FB	Playback feedback terminal.
7, 36.	REC FB	Recording feedback terminal.
8, 35.	GND	GND terminal.
9, 34.	LINE OUT	Line output (decode output) terminal.
10, 33.	SSK	Spectral skewing switch terminal.
11, 32.	VF IN	Encode circuit input terminal.
12, 31.	HPF H	HLS high-pass filter terminal.
13, 30.	TCH 2	HLS detector time constant terminal 2.
14, 29.	TCH 1	HLS detector time constant terminal 1.
15, 28.	WT H	HLS encoder error reduction terminal.
16, 27.	TCL 2	LLS detector time constant terminal 2.
17, 26.	TCL 1	LLS detector time constant terminal 1.
18, 25.	WT L	LLS encoder error reduction terminal.
19, 24.	HPF L	LLS high-pass filter terminal.
20, 23.	ANT S	Anti-saturation terminal.
21, 22.	REC OUT	Recording output (encode output) terminal.
38.	OFF/B/C	Dolby NR off/B type/C type select terminal.
40.	CAL IN	Calibration input terminal.
42.	Vee	Negative power supply terminal.

IC901 (M50940 - 313SP)

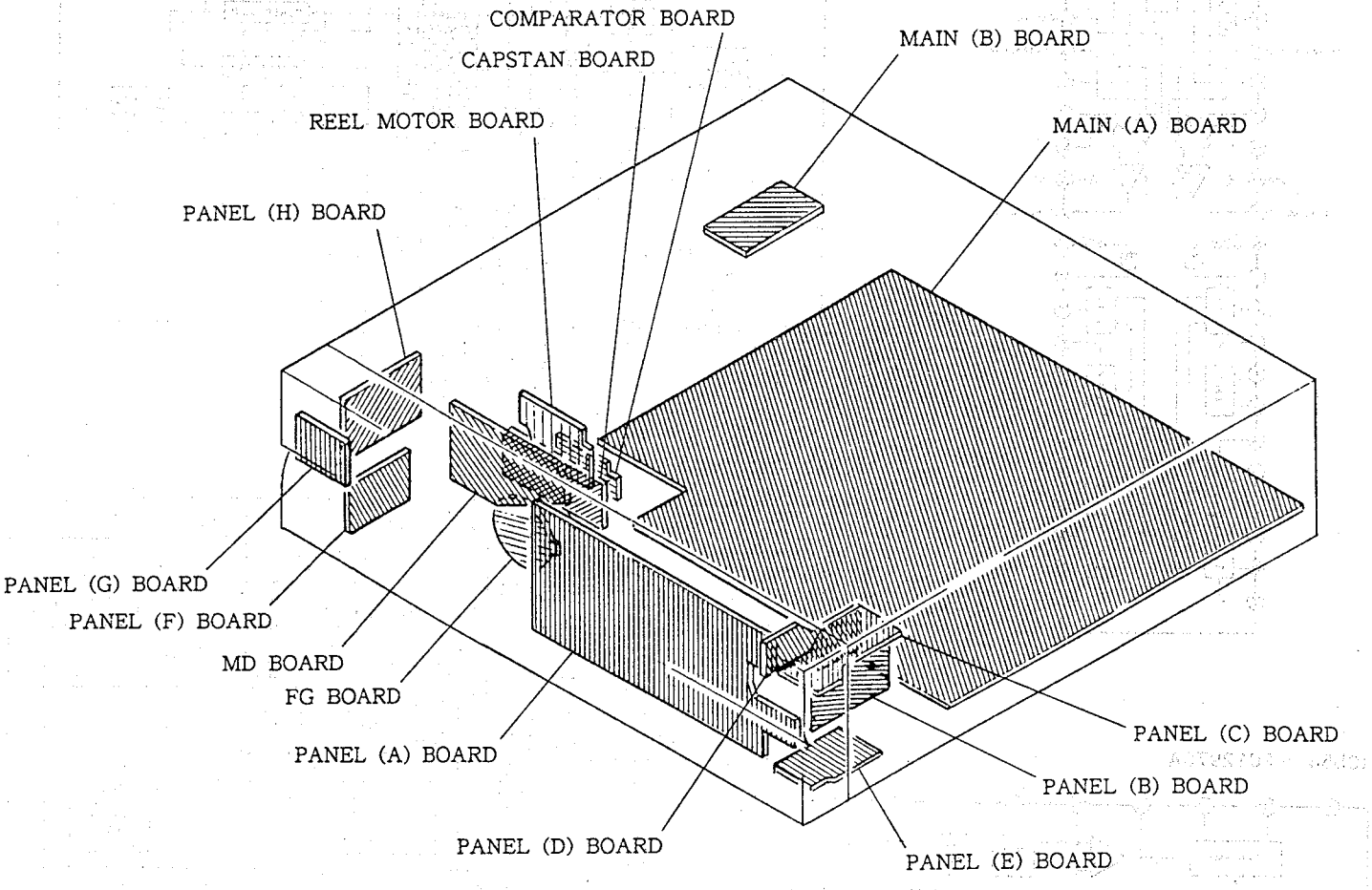
Level meter display of 24-segment fluorescent display, etc., are performed by receiving direction from the master microcomputer (IC801).

Pin No.	Pin name	I/O	Description
1.	Vref	I	A/D input-port reference voltage input(+5V)
2.	ϕL	I	Not used. (Connected to +5V)
3.	ϕR	I	Not used. (Connected to +5V)
4.	DATA	I	Data input from the master microcomputer(IC801)(analog)
5. ~6.	ADE1~ADR0	I	Data input from the master microcomputer(IC801)(analog)
7.	KEY	I	Not used. (Connected to +5V)
8.	LEVEL L	I	Level meter L-CH input(analog) from the meter amplifier(IC514)
9.	LEVEL R	I	Level meter R-CH input(analog) from the meter amplifier(IC514)
10. ~13.	$\overline{\text{GRID6}}$~$\overline{\text{GRID3}}$	O	Not used.
14. ~15.	$\overline{\text{GRID2}}$~$\overline{\text{GRID1}}$	O	Fluorescent display grid output
16.	$\overline{\text{COO}}$	O	Not used.
17.	$\overline{\text{PLAY}}$	O	Not used. (Connected to pin ⑱.)
18.	$\overline{\text{PLAY}}$	O	Not used.
19.	$\overline{\text{PAUSE}}$	O	Not used.
20.	$\overline{\text{REC}}$	O	Not used.
21.	$\overline{\text{TAPE}}$	O	Fluorescent display segment output("TAPE" displayed). "L": TAPE displayed. "H": SOURCE displayed.
22.	$\overline{\text{OVER LEVEL}}$	O	Fluorescent display segment output("OVER LEVEL" displayed). It is displayed when "L".
23.	TYPE I	O	Fluorescent display segment output("TYPE I" displayed). It is displayed when "L".
24.	$\overline{\text{TYPE II}}$	O	Fluorescent display segment output("TYPE II" displayed). It is displayed when "L".
25.	$\overline{\text{TYPE IV}}$	O	Fluorescent display segment output("TYPE III" displayed). It is displayed when "L".
26.	CNVss	-	Power supply terminal(GND)
27.	$\overline{\text{RESET}}$	I	Reset input
28.	XIN	I	Clock input(4MHz)
29.	XOUT	O	Clock outupt.
30.	XCIN	-	Not used. (Connected to GND)
31.	XCOUT	-	Not used.
32.	Vss	-	Power supply terminal(GND)
33.	Φ	O	Not used.
34.	VER	I	Version switching input(Always set to "L")
35.	$\overline{\text{TEST}}$	I	Test mode input. "L": All the lamps of the meter are lit.
36.	CAL	I	Calibration switch(S602) input. "L": CAL mode. "H": Normal mode.
37.	IN	I	Not used. (Connected to GND.)
38.	VP	I	Fluorescent display segment output's pull-down power supply terminal(-22V)
39. ~62.	S23~S0	O	Fluorescent display segment output(meter display)
63.	AVcc	-	Power supply terminal(+5V)
64.	Vcc	-	Power supply terminal(+5V)

IC801 (M50964-226SP)

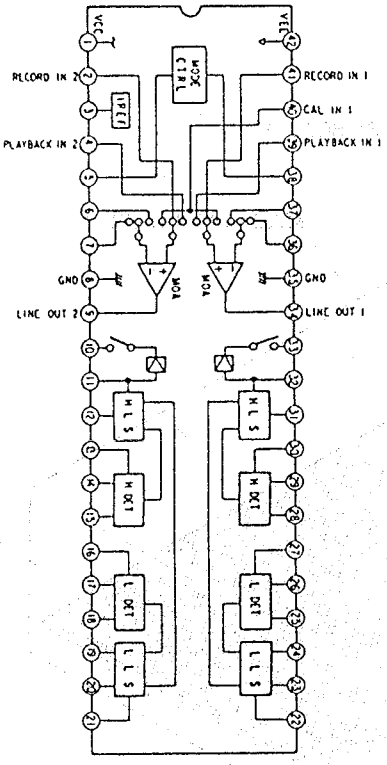
Pin No.	Pin name	I/O	Description
1.	VCC		Power supply: +5V.
2.	AVss		Analog GND.
3.	Vref	I	A/D port reference voltage input.
4.	DA		Not used for this model.
5.	PWM		Not used for this model.
6.	P.OFF		Not used for this model. Connected to GND.
7.	$\overline{LED}$	O	PAUSE LED output.
8.	$\overline{LED}$	O	REC LED output.
9.	$\overline{LED}$	O	PLAY LED output.
10.	AD1	I	Key input. 0V=⏏, 1V=■, 2V=◀◀, 3V=▶▶, 4V=●.
11.	AD2	I	Key input. 0V=▶, 1V=❚❚, 2V=⏮, 3V=⏭, 4V=○.
12.	AMS SIG	I	AMS signal input. No song detected = Low. Song detected = High.
13.	AD4	I	Key input. 2V = DISPLAY. 3V = MONITOR.
14.	CODE	I	Remote control category select switch.
15.	ALB		Connected to 5V.
16.	ϕR	I	Take-up reel base sensor input.
17.	ϕL	I	Supply reel base sensor input.
18.	C RESET		Model select input. Connected to GND.
19.	C MEMORY		Model select input. Connected to GND.
20.	COO		Not used for this model.
21.	POWER IN	I	Power on and off detection.
22.	SIRW	I	SIRCS phase input.
23.	$\overline{SIRE}$	I	SIRCS reverse phase input.
24.	$\overline{T\text{-}REC}$	I	Timer REC switch input.
25.	$\overline{T\text{-}PLAY}$	I	Timer PLAY switch input.
26.	$\overline{INT}$	I	External interruption input. Interruption process is performed when the power is on or off.
27.	Vss		GND.
28.	$\overline{RESET}$	I	Reset input.
29.	XIN	I	Clock input (4 MHz).
30.	XOUT	O	Clock output (4 MHz).
31.	ϕout		Not used for this model.
32.	Vss		GND.
33.	$\overline{C1}$	I	Rotary encoder input to detect the position of the head base of the mechanical block.
34.	$\overline{C2}$	I	Rotary encoder input to detect the position of the head base of the mechanical block.
35.	$\overline{C3}$	I	Rotary encoder input to detect the position of the head base of the mechanical block.
36.	$\overline{C4}$	I	Rotary encoder input to detect the position of the head base of the mechanical block.
37.	$\overline{OPEN\ SW}$	I	OPEN switch input of the mechanical block.
38.	$\overline{CLOSE\ SW}$	I	CLOSE switch input of the mechanical block.
39.	$\overline{DOOR\ SW}$	I	DOOR switch input of the mechanical block.
40.	$\overline{REC\ SW}$	I	REC switch input of the mechanical block.
41.	M PLAY	O	Reel motor rotates at PLAY speed.
42.	M FAST	O	Reel motor rotates at FF/REW speed.
43.	M FWD	O	Reel motor rotates.
44.	M REV	O	Reel motor rotates in reverse.
45.	CAM DOWN	O	Head base DOWN output of the mechanical block
46.	CAM UP	O	Head base UP output of the mechanical block
47.	C OFF	O	Counter light-off output
48.	M OFF	O	Meter light-off output
49.	BIAS	O	Bias oscillation on and off control
50.	$\overline{R\ Mt}$	O	REC MUTE.
51.	$\overline{M\ Mt}$		Not used for this model.
52.	$\overline{T\ Mt}$	O	Tape MUTE. Goes to low when the tape is being played.
53.	$\overline{S\ Mt}$	O	Source MUTE. Goes to low three seconds after the power is on.
54.	AMS	O	AMS switch output. Goes to low when AMS is being used.
55.	MONITOR		Not used for this model. Connected to GND.
56.	$\overline{HALF}$		Not used for this model. Connected to GND.
57.	DAT3	O	Outputs parallel data for the counter display.
58.	DAT2	O	Outputs parallel data for the counter display.
59.	DAT1	O	Outputs parallel data for the counter display.
60.	DAT0	O	Outputs parallel data for the counter display.
61.	DATD	O	Outputs parallel data for the counter display.
62.	CLK	O	Clock output to transmit the parallel data.
63.	LATCH	O	Output for latching the transmitted data.
64.	CAL IN	I	CAL switch input.

4-2. CIRCUIT BOARDS LOCATION

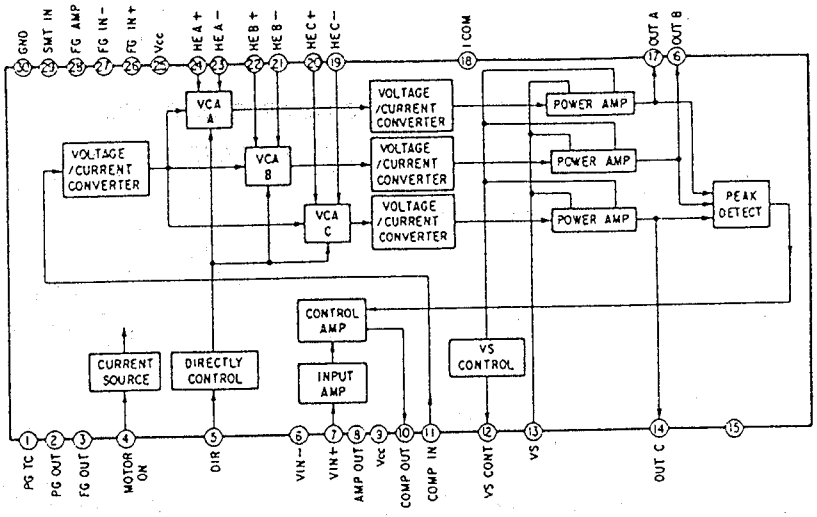


4-3. IC BLOCK DIAGRAMS

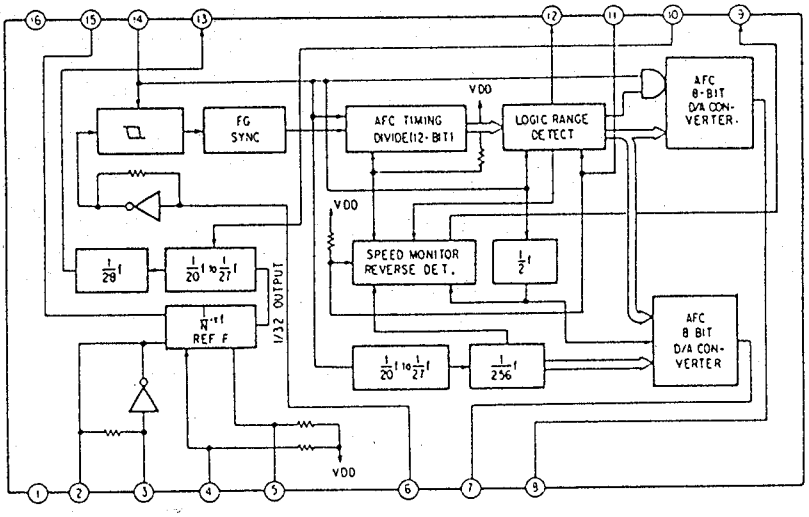
IC502, 552 CX20188



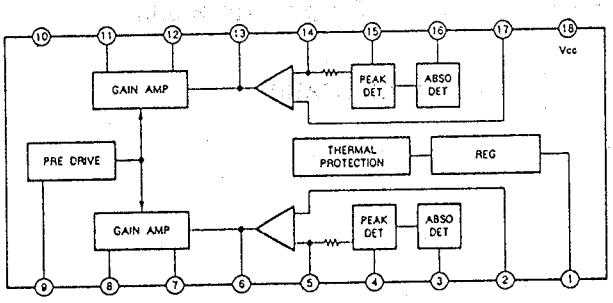
IC902B CX20174



IC952 TC 9142P

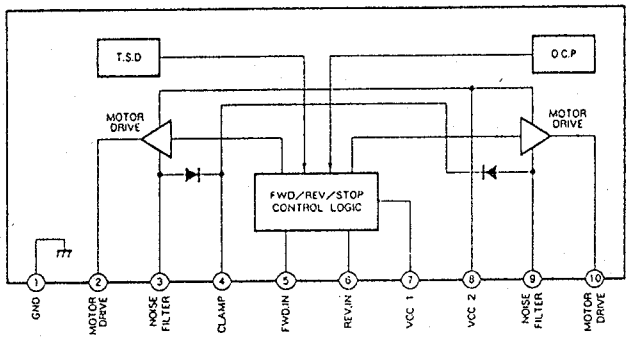


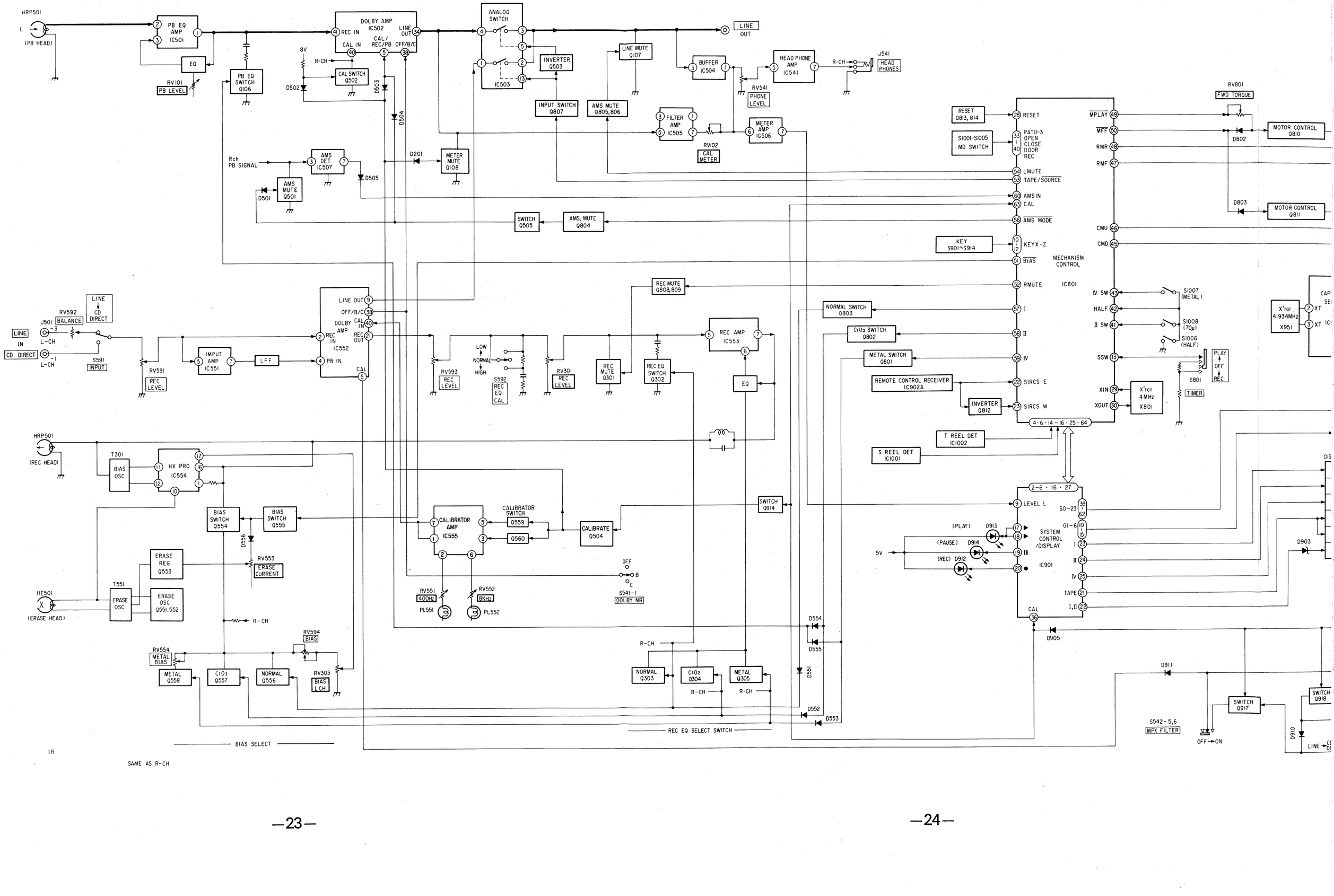
IC554 μPC1297CA

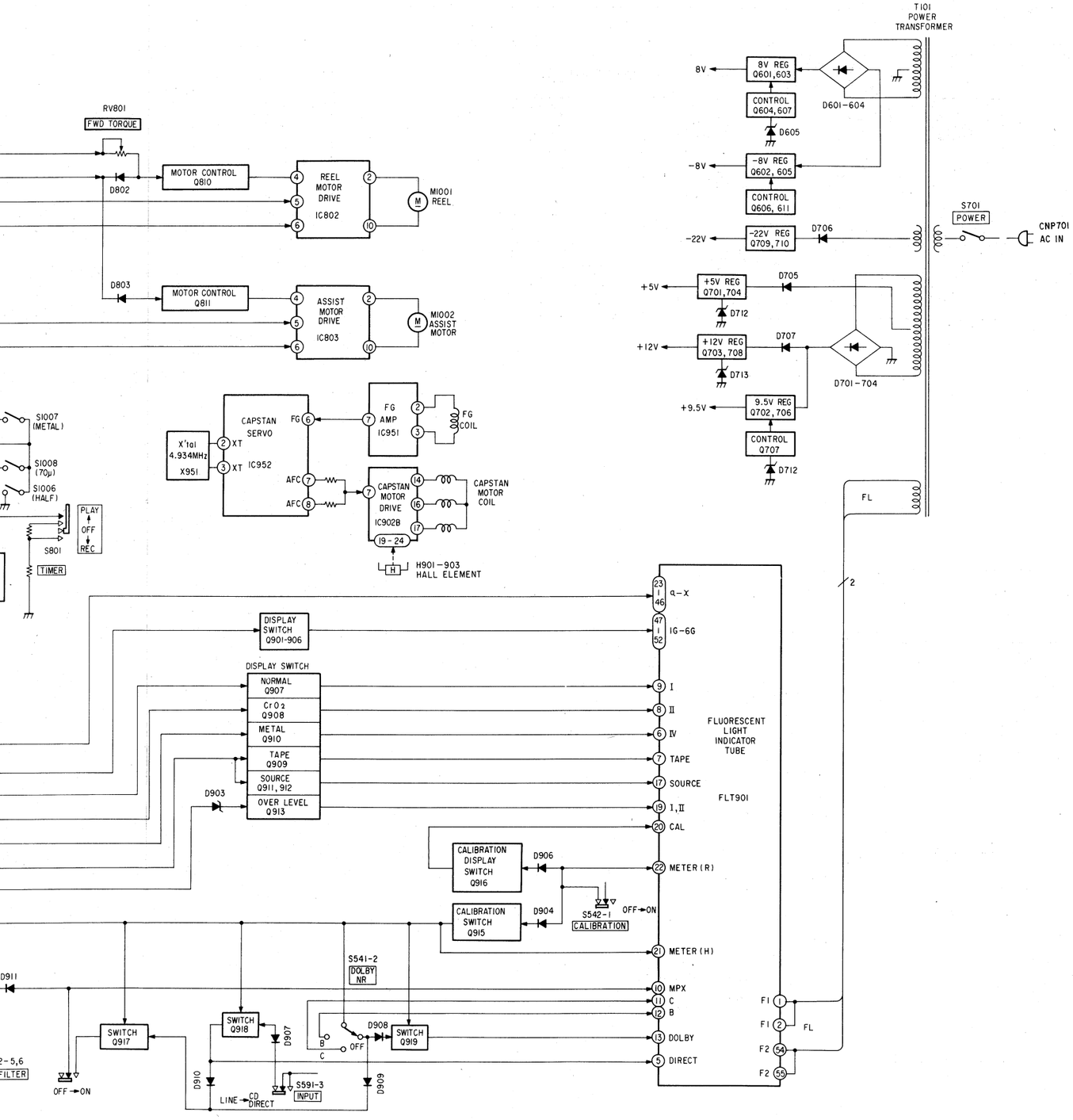


IC802 BA6219B

IC803 LB1641

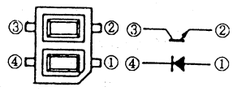



HRP501
L
(PB HEAD)
PB EQ AMP IC501
EQ
RV101 PB LEVEL
PB EQ SWITCH Q106
DOLBY AMP IC502
REC IN
CAL IN
CAL/REC/PB
OFF/B/C
LINE OUT
8V
R-CH
CAL SWITCH Q502
D502
D503
D504
ANALOG SWITCH
IC503
INVERTER Q503
INPUT SWITCH Q807
LINE MUTE Q107
AMS MUTE Q805,806
BUFFER IC504
FILTER AMP IC505
METER AMP IC506
RV102 CAL METER
RV541 PHONE LEVEL
HEAD PHONE AMP IC541
R-CH
J541 HEAD PHONES
LINE OUT
Rch PB SIGNAL
AMS DET IC507
AMS MUTE Q501
D501
D505
D201
METER MUTE Q108
SWITCH Q505
AMS, MUTE Q804
REC MUTE Q808,809
LINE IN
CD DIRECT
J501
RV592 BALANCE
LINE / CD DIRECT
S591 INPUT
L-CH
RV591 REC LEVEL
IMPUT AMP IC551
LPF
DOLBY AMP IC552
REC IN
PB IN
LINE OUT
OFF/B/C
CAL IN
REC OUT
CAL
RV593 REC LEVEL
LOW / NORMAL / HIGH
S592 REC EQ CAL
RV301 REC LEVEL
REC MUTE Q301
REC EQ SWITCH Q302
REC AMP IC553
EQ
HRP501
(REC HEAD)
T301
BIAS OSC
HX PRO IC554
BIAS SWITCH Q554
BIAS SWITCH Q555
D556
ERASE REG Q553
RV553 ERASE CURRENT
HE501
(ERASE HEAD)
T551
ERASE OSC
ERASE OSC Q551,552
R-CH
RV554 METAL BIAS
RV594 BIAS
METAL Q558
CrO2 Q557
NORMAL Q556
RV303 BIAS L CH
CALIBRATOR AMP IC555
CALIBRATOR SWITCH
Q559
Q560
CALIBRATE Q504
SWITCH Q914
OFF / B / C
S541-1 DOLBY NR
RV551 400Hz PL551
RV552 8KHz PL552
D554
D555
D551
D552
D553
R-CH
NORMAL Q303
CrO2 Q304
METAL Q305
R-CH
R-CH
BIAS SELECT
REC EQ SELECT SWITCH
SAME AS R-CH
RESET Q813, 814
S1001-S1005 MD SWITCH
PATO-3 OPEN CLOSE DOOR REC
LMUTE
TAPE/SOURCE
AMSIN
CAL
AMS MODE
KEY S901~S914
KEYX-Z
BIAS
MECHANISM CONTROL IC801
RMUTE
NORMAL SWITCH Q803
CrO2 SWITCH Q802
METAL SWITCH Q801
REMOTE CONTROL RECEIVER IC902A
INVERTER Q812
SIRCS E
SIRCS W
4·6·14-16·25·64
T REEL DET IC1002
S REEL DET IC1001
2-6·16·27
LEVEL L
SYSTEM CONTROL /DISPLAY IC901
(PLAY) D913
(PAUSE) D914
(REC) D912
5V
CAL
D905
D911
S542-5,6 MPX FILTER
OFF→ON
SWITCH Q917
SWITCH Q918
D910
LINE
RV801 FWD TORQUE
D802
D803
MOTOR CONTROL Q810
MOTOR CONTROL Q811
D903
MPLAY
MFF
RMR
RMF
CMU
CMD
IV SW
HALF
II SW
SSW
XIN
XOUT
X'tal 4MHz X801
S1007 (METAL)
S1008 (70μ)
S1006 (HALF)
PLAY / OFF / REC
S801
TIMER
X'tal 4.934MHz X951
XT
XT

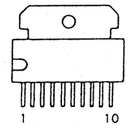


4-5. SEMICONDUCTOR LEAD LAYOUTS

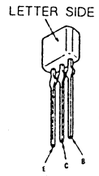
GP2S22B



LB1641

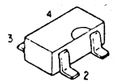


BNIL3Z-K
2SA1175-HFE



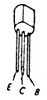
DTA114ES
DTA144ES
DTC114ES
DTC144ES
2SC2603-EF
2SD2144S

OH009

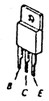


1 VH OUTPUT −
2 VC INPUT −
3 VH OUTPUT +
4 VC INPUT +

2SA1409-LK
2SB1116A-L
2SC945-P
2SC1815-Y

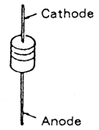


2SB1094-LK
2SD1585-LK
2SD2012

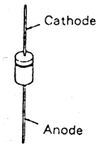


2SK246-GR

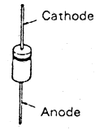
HZS6C3L
HZS9B2L
UZP-8.2BB
UZL-6L3
UZL-12H1



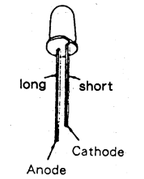
30DF2



1N4148M
10E2N



SEL1210S
SEL1210S-C
SEL1910A-C

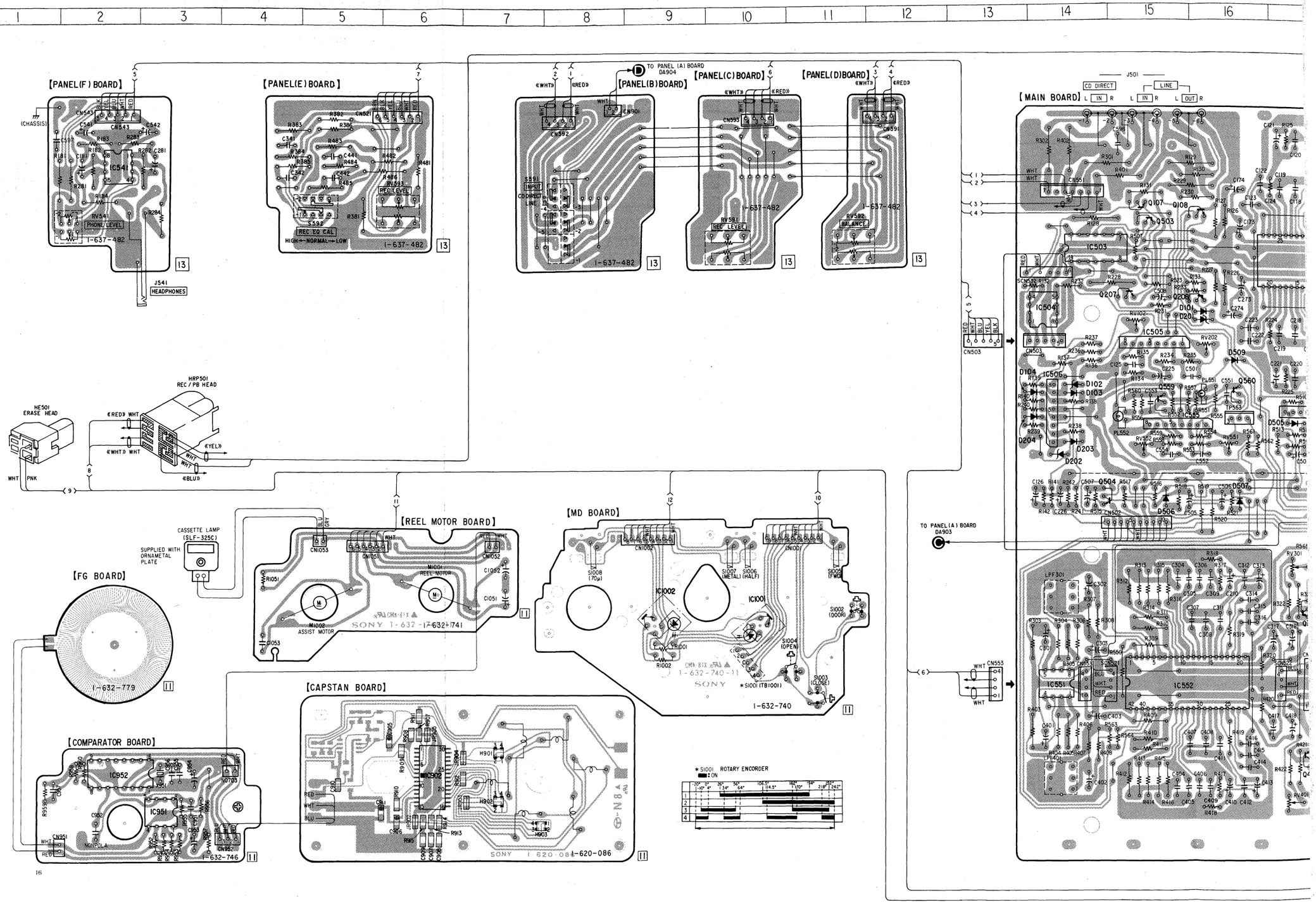


4-6. PRINTED WIRING BOARDS – MAIN SECTION –

• See page 21 for Circuit Boards Location. • See page 26 for Semiconductor Lead Layouts.

• Semiconductor Location

Ref. No.	Location	Ref. No.	Location
D101	D-16	Q105	B-20
D102	E-14	Q106	B-18
D103	E-14	Q107	C-15
D104	E-13	Q108	C-15
D201	D-16	Q201	E-19
D202	H-14	Q202	E-19
D203	F-14	Q203	E-20
D204	E-13	Q204	E-20
D501	F-18	Q205	E-20
D502	F-18	Q206	F-18
D503	E-18	Q207	D-15
D504	E-18	Q208	D-16
D505	E-17	Q301	H-17
D506	F-15	Q302	H-17
D507	F-16	Q303	H-17
D508	F-14	Q304	H-18
D509	E-16	Q305	H-18
D551	G-21	Q306	H-19
D552	G-21	Q401	J-17
D553	G-20	Q402	J-17
D554	G-21	Q403	J-17
D555	G-20	Q404	I-18
D556	J-21	Q405	I-18
D601	D-23	Q406	I-19
D602	D-23	Q501	F-19
D603	C-23	Q502	F-18
D604	C-23	Q503	C-15
D605	E-21	Q504	H-14
D701	D-24	Q505	F-17
D702	D-24	Q551	J-20
D703	E-23	Q552	J-20
D704	E-23	Q553	J-20
D705	D-24	Q554	I-21
D706	E-24	Q555	I-21
D707	D-25	Q556	G-21
D708	B-25	Q557	G-20
D712	B-24	Q558	G-20
D713	C-26	Q559	E-15
D714	D-26	Q560	E-16
D715	D-25	Q601	E-21
D716	E-26	Q602	B-21
D801	G-25	Q603	E-21
D802	G-24	Q604	E-21
D803	G-24	Q605	B-21
		Q606	B-21
IC501	D-19	Q607	E-21
IC502	C-17	Q611	C-21
IC503	C-14	Q701	B-23
IC504	D-14	Q702	B-24
IC505	D-15	Q703	B-25
IC506	E-14	Q704	B-23
IC507	E-17	Q706	B-24
IC541	B-2	Q707	B-25
IC551	I-14	Q708	B-26
IC552	I-15	Q709	D-25
IC553	I-18	Q710	D-25
IC554	I-21	Q801	G-26
IC555	E-15	Q802	G-25
IC801	H-24	Q803	G-25
IC802	F-23	Q804	G-25
IC803	G-23	Q805	G-25
IC902A	J-6	Q806	G-25
IC951	J-3	Q807	G-25
IC952	J-2	Q808	G-24
IC1001	H-10	Q809	G-24
IC1002	H-9	Q810	F-24
		Q811	G-24
Q101	B-20	Q812	I-24
Q102	B-19	Q813	I-23
Q103	B-20	Q814	I-23
Q104	B-20		



Note on Mounting Diagram:

- o—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.

【MAIN(B) BOARD】

【PANEL(H) BOARD】

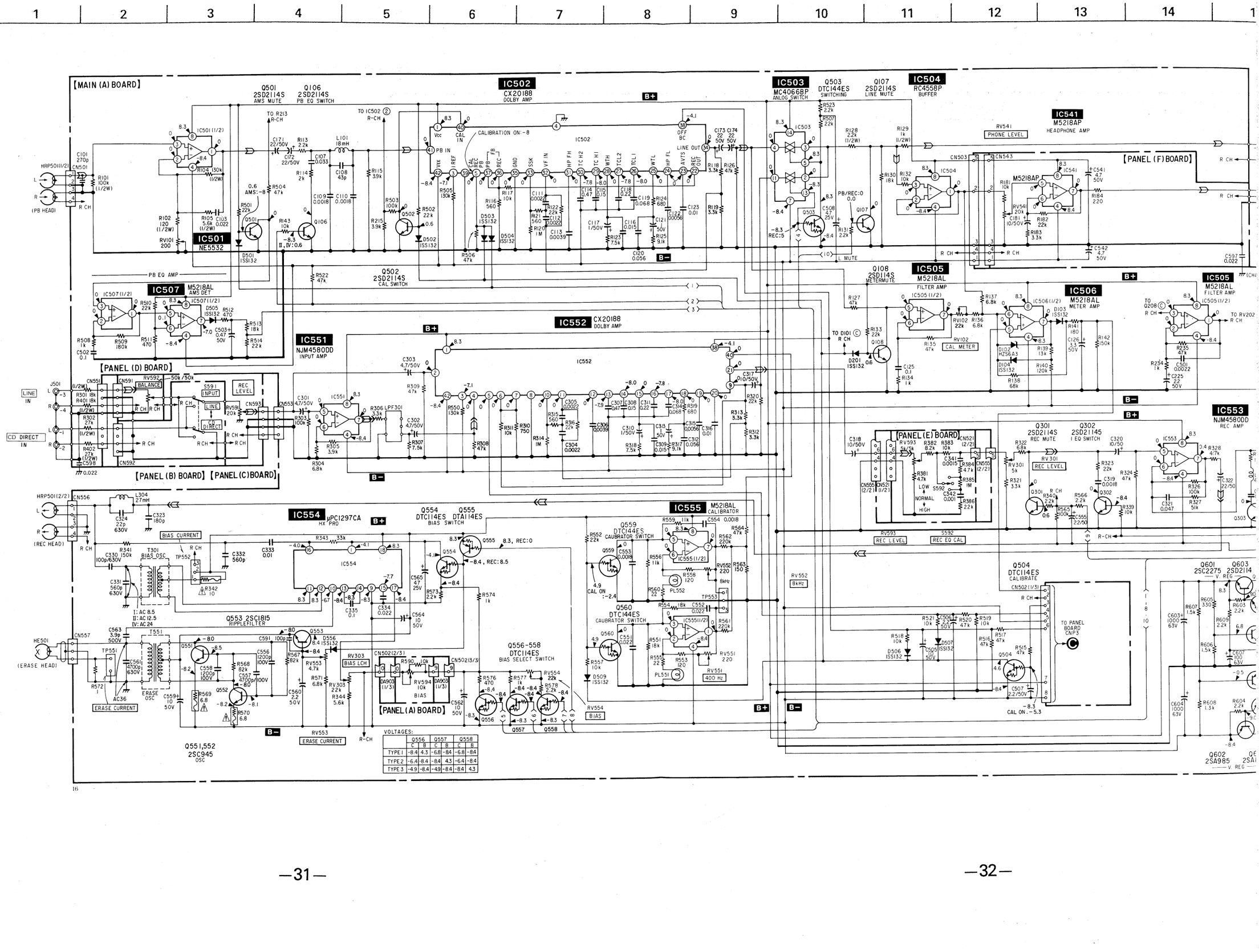
【PANEL(G)BOARD】

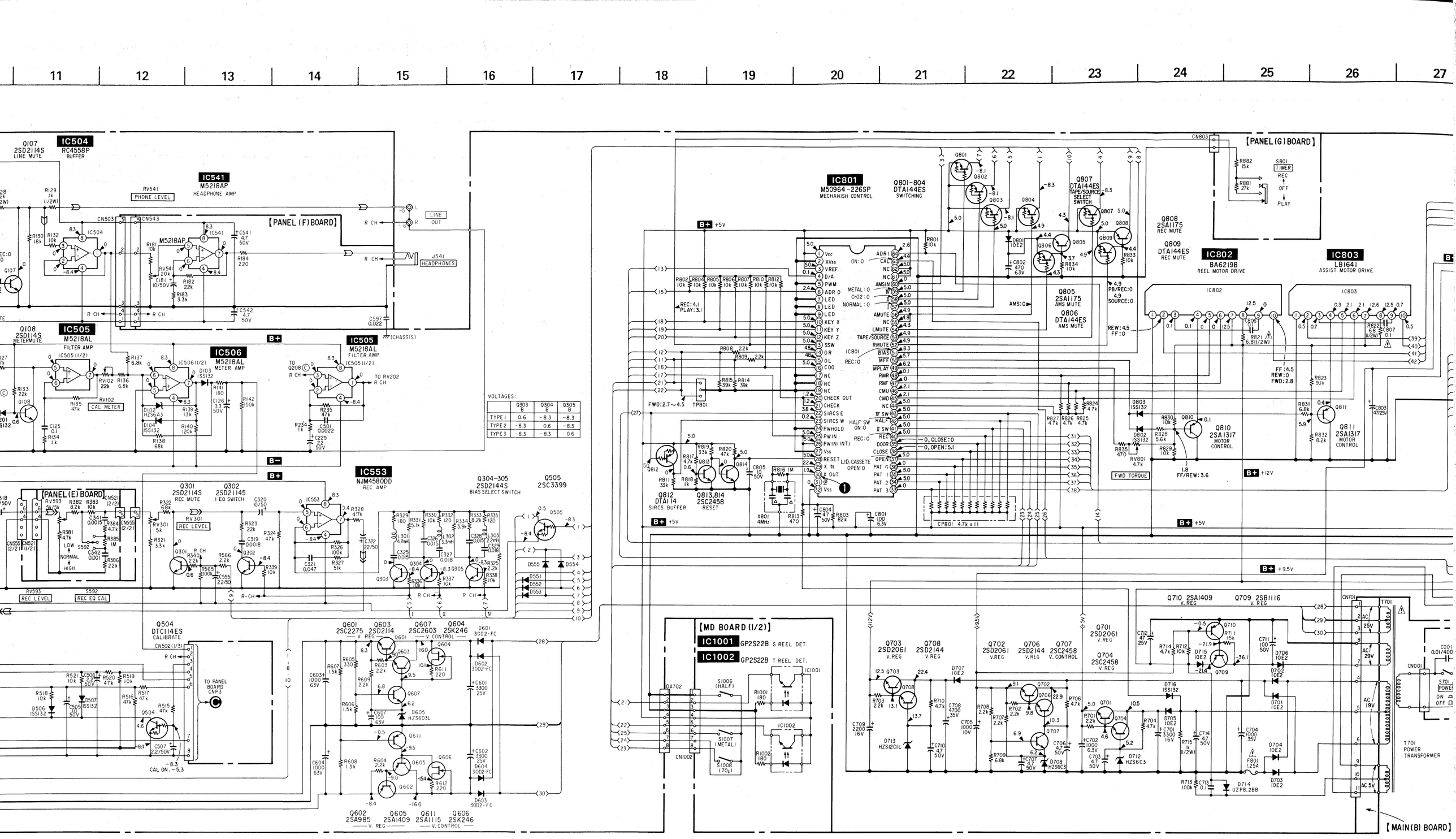
TO PANEL(A) BOARD DA901

TO PANEL(B) BOARD DA902

4-7. SCHEMATIC DIAGRAM – MAIN SECTION –

• See page 22 for IC Block Diagrams.

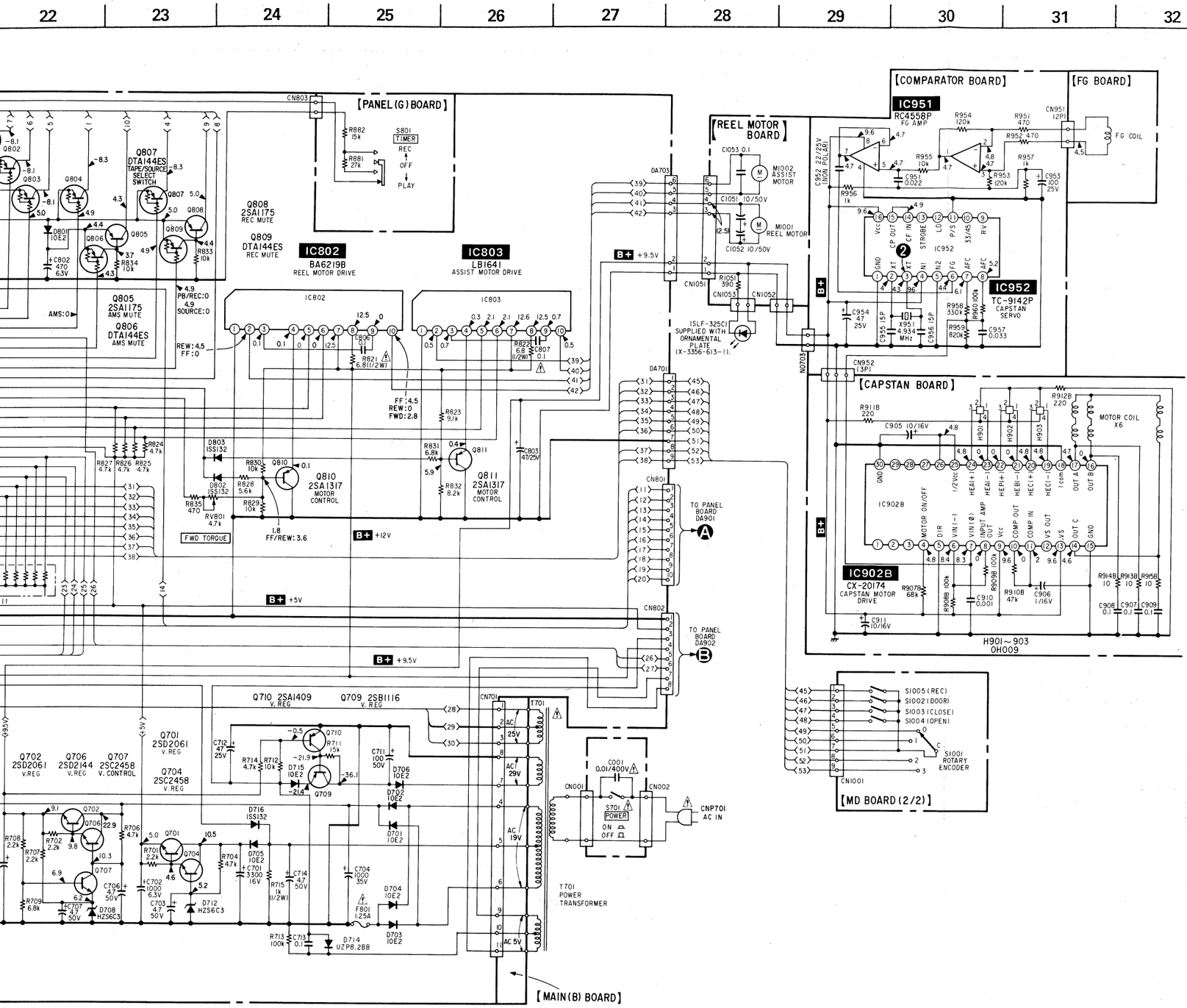



IC504
RC4558P
BUFFER
Q107
2SD2114S
LINE MUTE
IC541
M5218AP
HEADPHONE AMP
RV541
PHONE LEVEL
【PANEL (F) BOARD】
LINE OUT
J541
HEADPHONES
Q108
2SD1114S
METERMUTE
IC505
M5218AL
FILTER AMP
IC506
M5218AL
METER AMP
RV102
CAL. METER
IC505
M5218AL
FILTER AMP
【PANEL (E) BOARD】
RV593
REC LEVEL
S592
REC EQ CAL
Q301
2SD2114S
REC MUTE
Q302
2SD2114S
I EQ SWITCH
RV301
REC LEVEL
IC553
NJM4580DD
REC AMP
Q304-305
2SD2144S
BIAS SELECT SWITCH
Q505
2SC3399
Q504
DTC114ES
CALIBRATE
TO PANEL BOARD CNP3
Q601
2SC2275
V. REG
Q603
2SD2114
Q607
2SC2603
V. CONTROL
Q604
2SK246
Q602
2SA985
V. REG
Q605
2SA1409
Q611
2SA1115
V. CONTROL
Q606
2SK246
VOLTAGES:
TYPE1 0.6 -8.3 -8.3
TYPE2 -8.3 0.6 -8.3
TYPE3 -8.3 -8.3 0.6
IC801
M50964-226SP
MECHANISM CONTROL
Q801-804
DTA144ES
SWITCHING
Q807
DTA144ES
TAPE/SOURCE SELECT SWITCH
Q805
2SA1175
AMS MUTE
Q806
DTA144ES
AMS MUTE
Q808
2SA1175
REC MUTE
Q809
DTA144ES
REC MUTE
【PANEL (G) BOARD】
S801
TIMER
REC
OFF
PLAY
IC802
BA6219B
REEL MOTOR DRIVE
IC803
LB1641
ASSIST MOTOR DRIVE
Q810
2SA1317
MOTOR CONTROL
Q811
2SA1317
MOTOR CONTROL
FWD TORQUE
Q812
DTA114
SIRCS BUFFER
Q813,814
2SC2458
RESET
X801
4MHz
CP801 4.7k x 11
【MD BOARD (1/2)】
IC1001 GP2S22B S REEL DET.
IC1002 GP2S22B T REEL DET.
CN1002
DA702
S1006 (HALF)
S1007 (METAL)
S1008 (70μ)
Q703
2SD2061
V. REG
Q708
2SD2144
V. REG
Q702
2SD2061
V. REG
Q706
2SD2144
V. REG
Q707
2SC2458
V. CONTROL
Q701
2SD2061
V. REG
Q704
2SC2458
V. REG
Q710 2SA1409
V. REG
Q709 2SB1116
V. REG
T701
POWER TRANSFORMER
【MAIN (B) BOARD】

—32—

—33—

—34—



Note on Schematic Diagram:

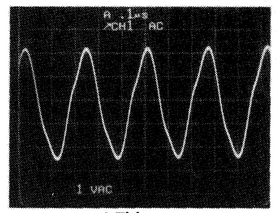
- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.
- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- △ : internal component.
- : nonflammable resistor.
- : fusible resistor.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- **+B** : B+ Line.
- **+B** : B− Line
- : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions. no mark : STOP
- Voltages are taken with a VOM (Input impedance 10MΩ) Voltage variations may be noted due to normal production tolerances.
- **Waveforms are taken with a oscilloscope.**
- Signal path.
  - : PB
  - : REC

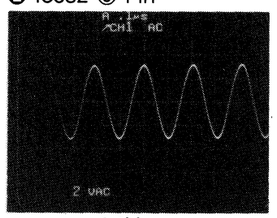
• Waveforms

❶ IC801 ㉚ Pin



4.7Vp-p 0.26 μs

❷ IC952 ③ Pin



6.2Vp-p 0.21 μs

4-8. SCHEMATIC DIAGRAM – PANEL SECTION –

• See page 22 for IC Block Diagrams.

【PANEL (A) BOARD】

FLT901 FLUORESCENT LIGHT INDICATOR TUBE

HIGH L
LOW R
DIRECTION
REC CAL NORMAL CrO2 METAL CD DIRECT
MEMORY
DOLBY NR B C MPX FILTER HX PRO SOURCE TAPE

Q903-906
DTA114ES
SWITCHING

Q902
2SA1115
SWITCHING

Q901
DTA143TS
SWITCHING

VOLTAGES:

	Q907		Q908		Q910	
	B	C	B	C	B	C
TYPE1	0.1	5.0	5.0	-20.5	5.0	-20.5
TYPE2	5.0	-20.5	0.1	5.0	5.0	-20.5
TYPE3	5.0	-20.5	5.0	-20.5	0.1	5.0

IC901
M50940-313SP
SYSTEM CONTROL / DISPLAY

VOLTAGES:

IC901	23	24	25
NORMAL TAPE	0.1	5.0	5.0
CrO2 TAPE	5.0	0.1	5.0
METAL TAPE	5.0	5.0	0.1

CP901 100k x6
CP902 100k x6
CP903 100k x9
R931 4.7k
R929 22k
R922 22k
R921 22k
R923 1M
X901 4.0MHz
C901 100 6.3V
R919 270
R918 220
R920 390
D912 SEL1210S-C
D913 SEL1410E-C
D914 SEL1910A-C
D901 ISS132
D902 ISS132
R901 2.2k
R902 22k
R903 470k
R905 22k
R904 22k

DA901
OL
OR
DATA
ADRI
ADRO
COO
RES
KEYX
KEYY
KEYZ
TO AUDIO BOARD CN801 (A)

DA902
+5V
-22V
+12
CAL
SIRCS
F2
F1
TO AUDIO BOARD CN802 (B)

R917A 15k
R913A 2.7k
R914A 3.9k
R915A 8.2k
R916A 27k
R909A 2.7k
R910A 3.9k
R911A 82k
R912A 27k
R906 10k
R907A 4.7k
R908A 15k

S914 MONITOR
S909 ▶
S910 PAUSE
S911 ▶◀◀
S912 ▶▶◀
S913 REC MUTE
S904 OPEN/CLOSE
S905 ■
S906 ◀◀
S907 ▶▶
S908 REC
S901 MEMORY
S902 RESET
S903 DISPLAY MODE

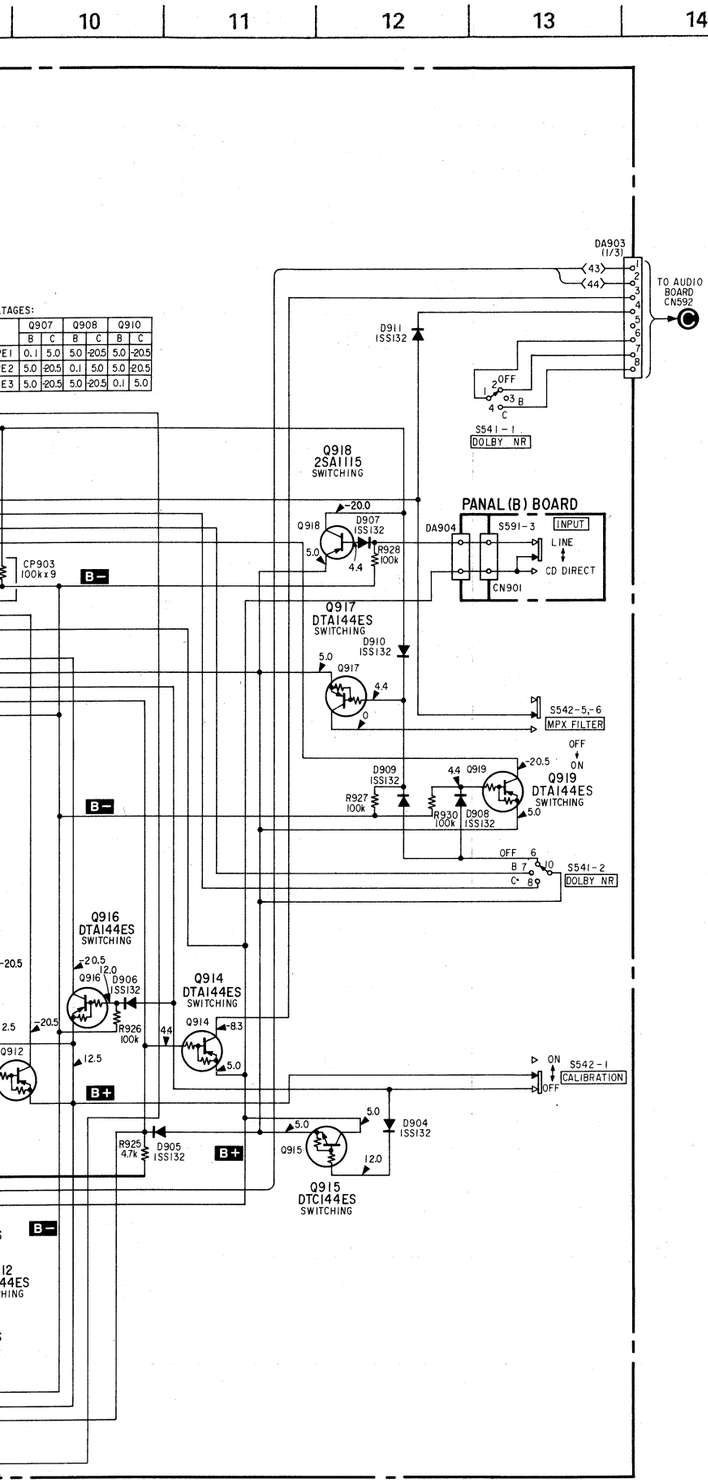
— AMS —
— COUNTER —

IC902A
SBX1610-59
REMOTE CONTROL RECEIVER
IC902A

Q907 DTA144ES SWITCHING
Q908 DTA144ES SWITCHING
Q909 DTA144ES SWITCHING
Q910 DTA144ES SWITCHING
Q907-910 DTA144ES SWITCHING
Q913 DTA144ES SWITCHING
Q912 DTA144ES SWITCHING
Q911 DTC144ES SWITCHING
Q916 DTA144ES SWITCHING
Q914 DTA144ES SWITCHING
Q915 DTC144ES SWITCHING
Q917 DTA144ES SWITCHING
Q919 DTA144ES SWITCHING
Q918 2SA1115 SWITCHING
D903 HZS-9MI
D905 ISS132
D906 ISS132
D907 ISS132
D908 ISS132
D909 ISS132
D910 ISS132
D911 ISS132
D904 ISS132

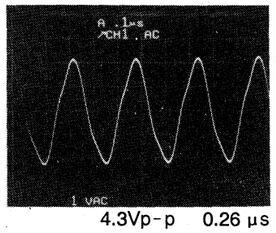
DA903 (1/3)
TO AUDIO BOARD CN592 (C)
S541-1 DOLBY NR
S541-2 DOLBY NR
S542-1 CALIBRATION
S542-5,-6 MPX FILTER
S591-3 INPUT LINE / CD DIRECT
DA904
CN901
PANAL (B) BOARD

B+
B−

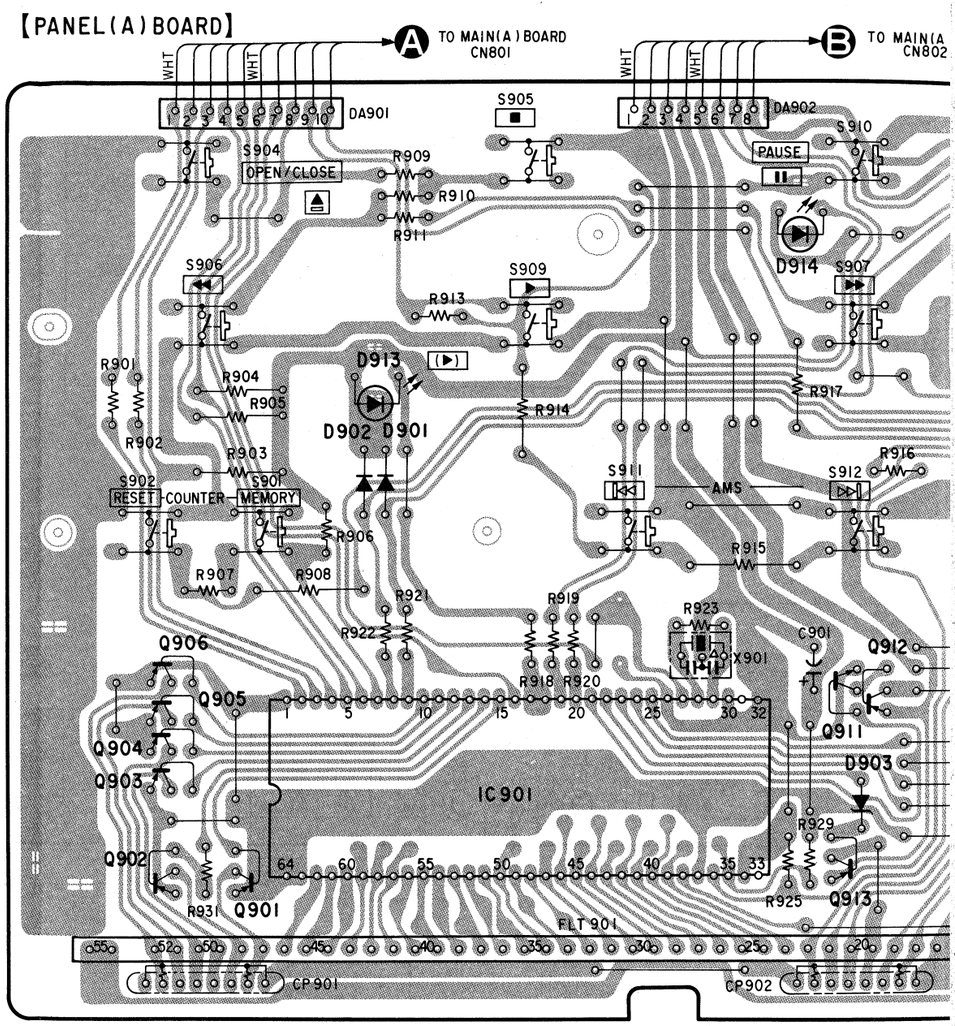


• Waveforms

❸ IC901 ㉘ Pin

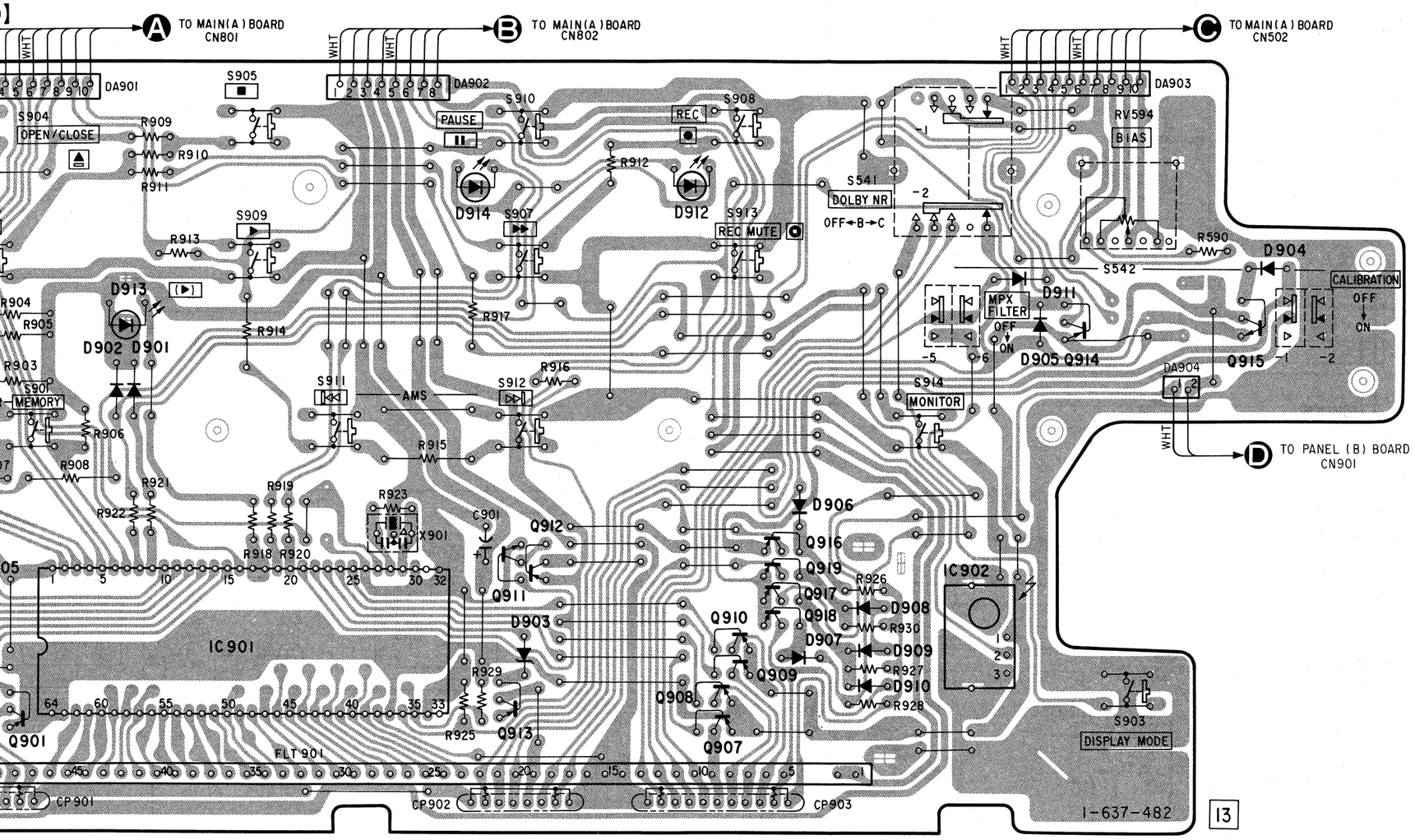


4.3Vp-p 0.26 µs



16

	3	4	5	6	7	8	9	10



• Semiconductor Location

Ref. No.	Location
D901	C-3
D902	C-3
D903	D-5
D904	B-9
D905	C-8
D906	D-7
D907	D-7
D908	D-7
D909	D-7
D910	E-7
D911	B-8
D912	B-6
D913	C-3
D914	B-5
IC901	D-3
IC902B	D-8
Q901	E-2
Q902	E-2
Q903	D-2
Q904	D-2
Q905	D-2
Q906	D-2
Q907	E-6
Q908	E-6
Q909	E-6
Q910	D-6
Q911	D-5
Q912	D-5
Q913	E-5
Q914	C-8
Q915	C-9
Q916	D-7
Q917	D-7
Q918	D-7
Q919	D-7

Note on Mounting Diagram:
• o—— : parts extracted from the component side.

SECTION 5
EXPLODED VIEWS

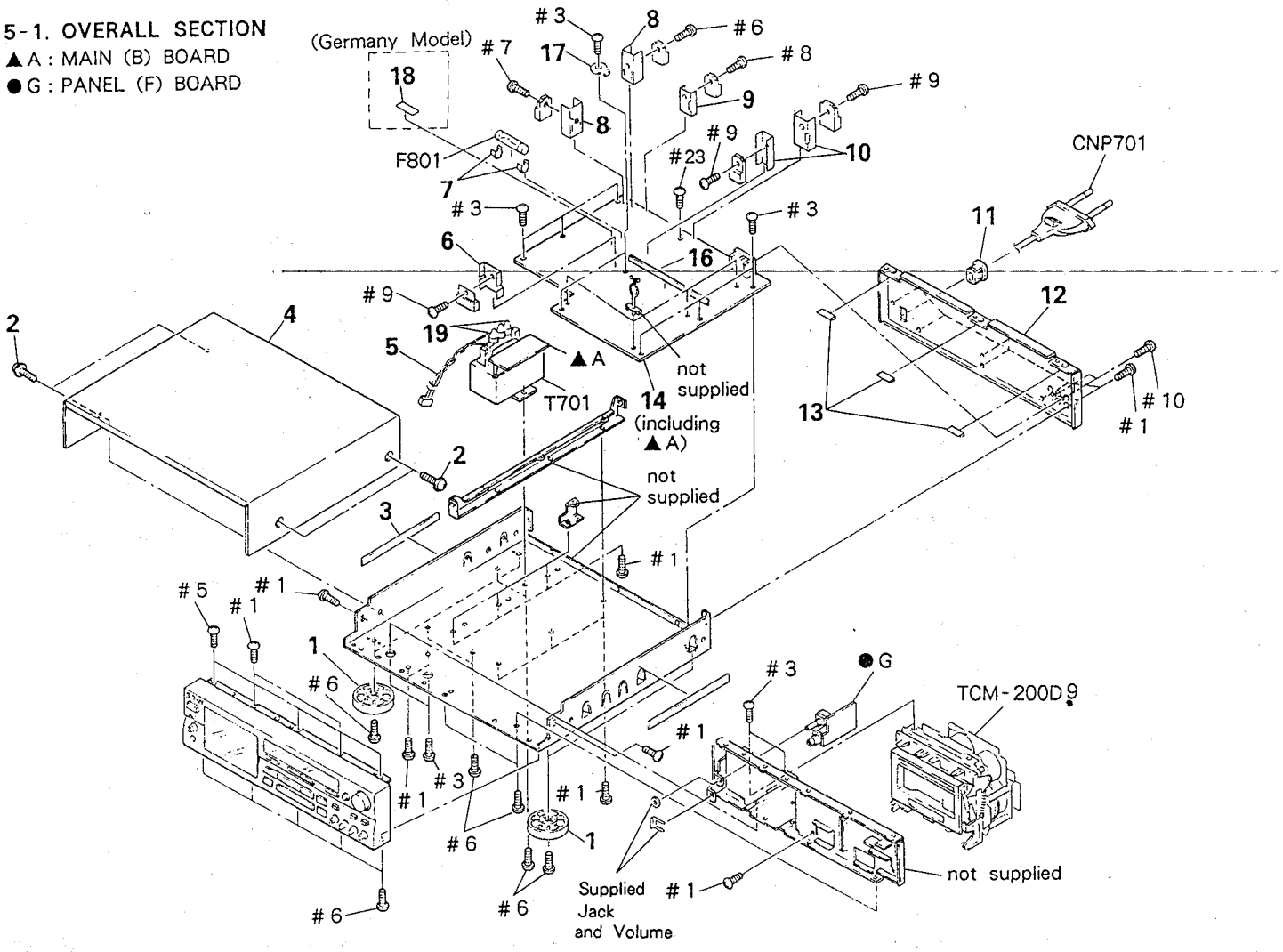
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example :
  KNOB, BALANCE (WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. OVERALL SECTION

▲A : MAIN (B) BOARD
● G : PANEL (F) BOARD

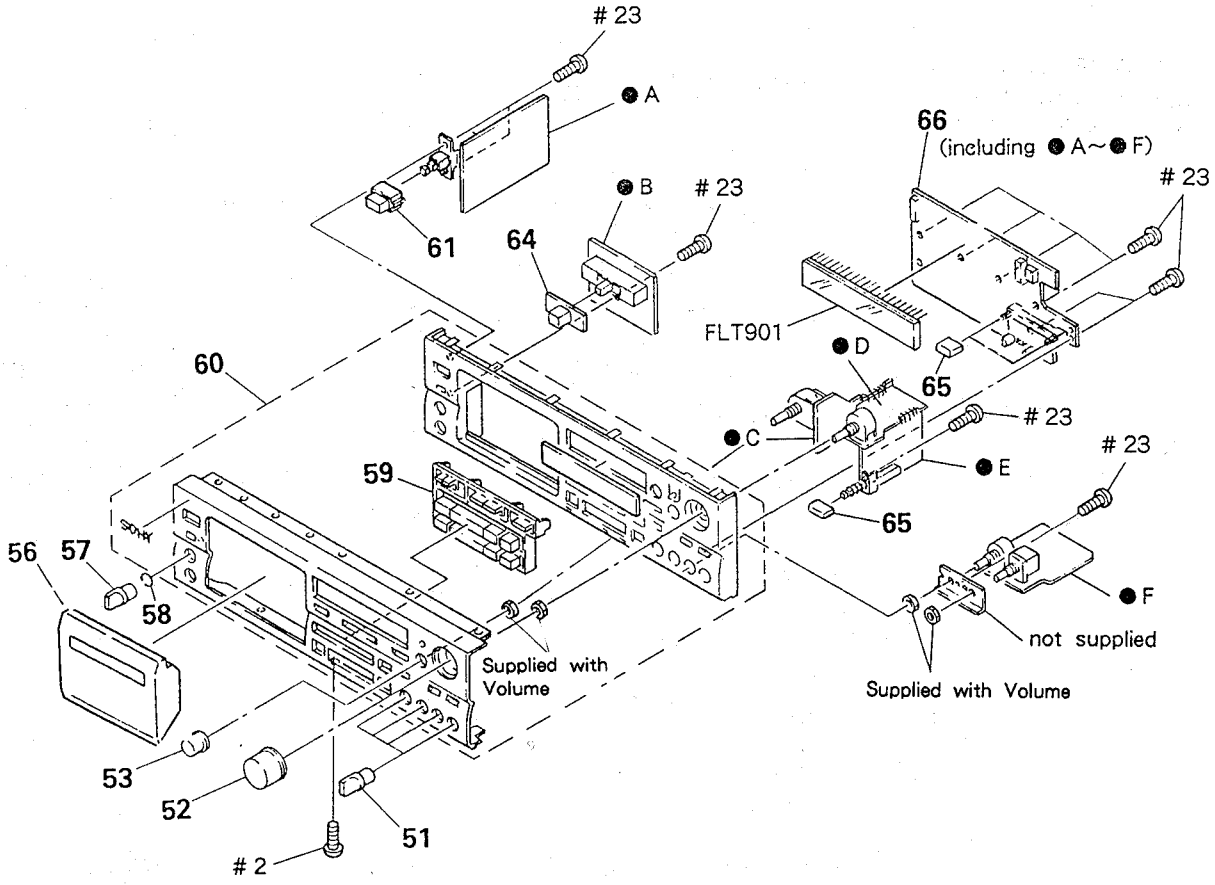


Ref. No.	Part No.	Description	Remarks
1	X-3304-944-1	FOOT ASSY	
2	3-704-366-01	SCREW (CASE) (M3X8)	
3	* 3-657-780-00	CUSHION	
4	4-925-039-61	CASE	
5	* 1-590-321-51	LEAD (WITH CONNECTOR)	
6	* 3-356-925-01	HEAT SINK	
7	* 1-533-213-31	HOLDER FUSE	
8	4-902-345-01	HEAT SINK	
9	* 3-309-144-21	HEAT SINK	
10	* 4-880-403-11	HEAT SINK	
11	* 3-703-244-00	BUSHING (2104), CORD	

Ref. No.	Part No.	Description	Remarks
12	* 3-378-828-01	PANEL, BACK (Germany)	
12	* 3-378-828-11	PANEL, BACK (AEP)	
13	3-831-441-XX	CUSHION, SPEAKER	
14	* A-2006-780-A	MAIN BOARD, COMPLETE	
16	* 1-560-242-91	BUS BAR 10P	
17	4-870-539-00	PLATE, GROUND	
19	* 4-912-962-01	COVER (1P), TERMINAL	
T701	⚠1-450-856-11	TRANSFORMER, POWER	
F801	⚠1-532-285-00	FUSE, TIME-LAG	
CNP701	⚠1-575-651-11	CORD, POWER	

5-2. PANEL SECTION

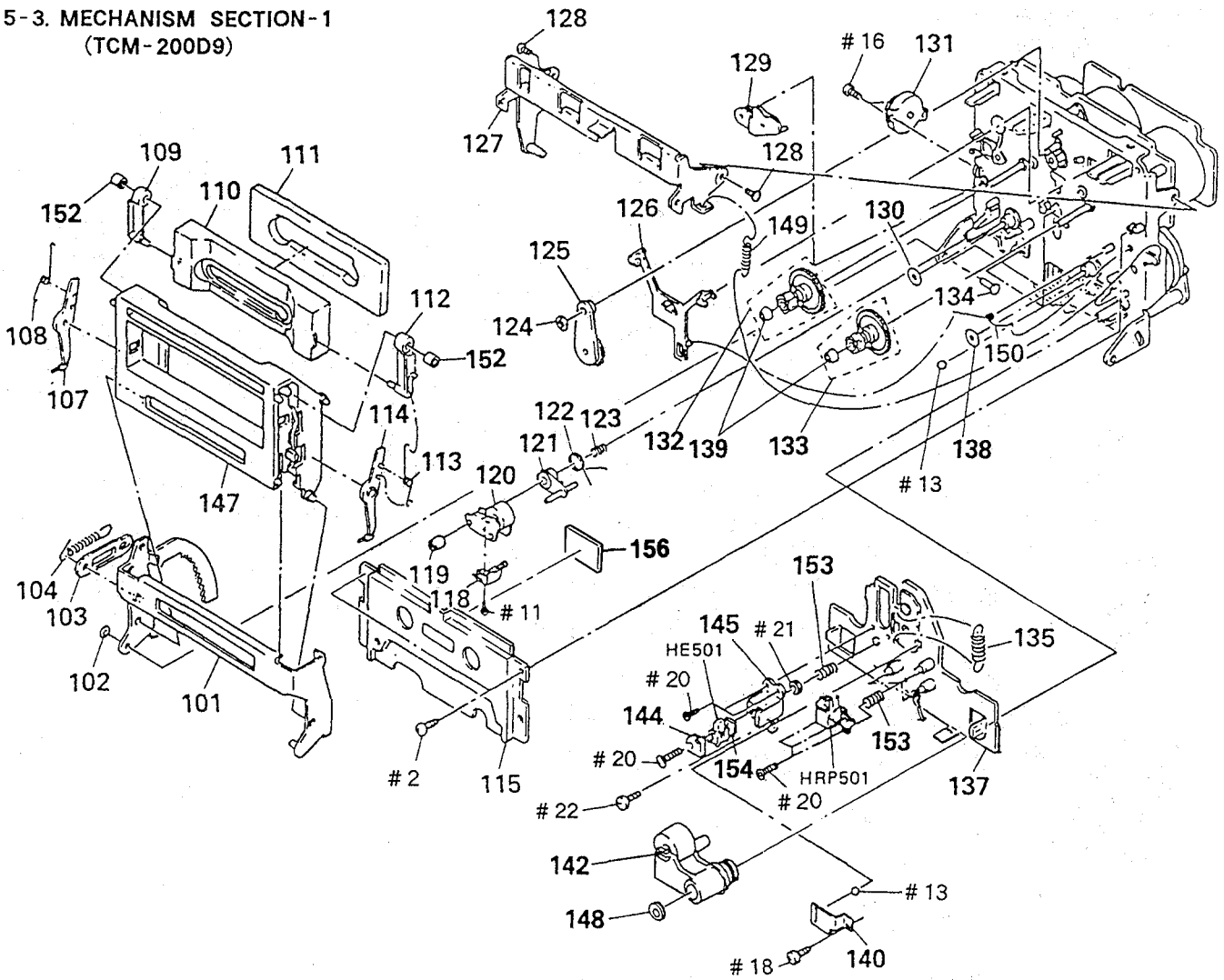
● A : PANEL (H)
● B : PANEL (G)
● C : PANEL (D)
● D : PANEL (C)
● E : PANEL (B)
● F : PANEL (E)



Ref. No.	Part No.	Description	Remarks
51	X-3362-818-1	KNOB (DIA. 12) ASSY (B), FLAT	
52	X-3362-289-1	KNOB (VOL) ASSY	
53	X-3365-387-1	KNOB (BAL)	
56	X-3365-080-1	LID ASSY, CASSETTE	
57	3-354-931-01	KNOB (DIA. 10)	
58	3-354-981-01	SPRING (SUS), RING	
59	X-3362-290-1	BUTTON (BLOCK) ASSY	

Ref. No.	Part No.	Description	Remarks
60	A-2004-076-A	PANEL ASSY, FRONT	
61	3-354-912-01	KNOB, POWER	
64	4-922-518-01	KNOB (TIMER)	
65	3-364-165-01	BUTTON (14X5)	
66	* A-2006-781-A	PANEL BOARD, COMPLETE	
FLT901	1-519-560-21	INDICATOR TUBE, FLUORENCENT	

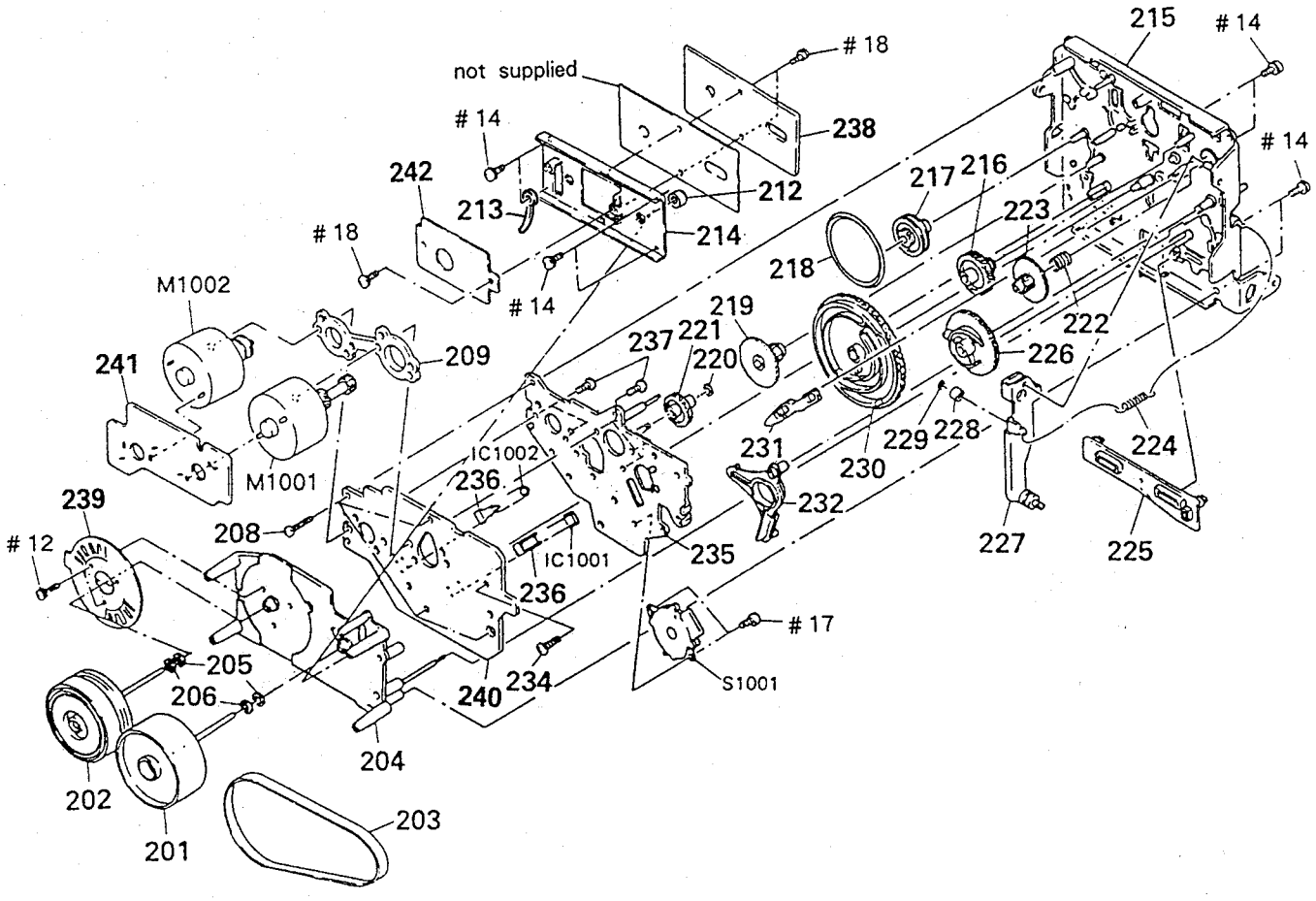
5-3. MECHANISM SECTION-1 (TCM-200D9)



Ref. No.	Part No.	Description	Remarks
101	X-3362-671-1	HOLDER (BG) ASSY, CASSETTE	
102	3-558-708-21	WASHER, STOPPER	
103	* 3-356-717-01	LEVER (JOINT)	
104	3-356-626-01	SPRING, TENSION	
107	3-356-932-01	LEVER (LA)	
108	3-356-927-01	SPRING (LEFT), TORSION	
109	3-356-933-01	LEVER (LB)	
110	3-356-928-01	PLATE (A), ORNAMENTAL	
111	* 3-356-929-01	ABSORBENT, VIBRATION	
112	3-356-931-01	LEVER (RB)	
113	3-356-926-01	SPRING (RIGHT), TORSION	
114	3-356-930-00	LEVER (RA)	
115	X-3356-613-1	PLATE ASSY, ORNAMENTAL	
118	3-564-138-00	GUIDE (S), TAPE	
119	3-356-652-01	NUT (PINCH LEVER S)	
120	X-3356-621-1	LEVER (PINCH LEVER S) ASSY	
121	3-356-660-01	LEVER (PS)	
122	3-356-661-01	SPRING (PINCH LEVER S), TORSION	
123	3-356-657-01	SPRING (PS), COMPRESSION	
124	3-669-465-00	WASHER (1.5), STOPPER	
125	X-3356-641-1	LEVER (FR2) ASSY	
126	3-356-614-01	SLIDER (BRAKE)	
127	* X-3356-608-1	LEVER (LIFTER) ASSY	
128	3-356-601-11	SCREW, STEP	
129	X-3356-623-1	LEVER (BT) ASSY	

Ref. No.	Part No.	Description	Remarks
130	3-356-713-01	WASHER	
131	3-319-224-41	DAMPER, SMALL	
132	X-3356-629-1	GEAR (S) ASSY	
133	X-3356-627-1	GEAR (T) ASSY	
134	3-356-710-01	SHAFT (LEFT) (CASSETTE HOLDER)	
135	3-356-658-01	SPRING (LIMITER H), TENSION	
137	* X-3362-199-1	SLIDER (HEAD CHASSIS D) ASSY	
138	3-332-763-01	RING, OIL RESERVOIR	
139	3-362-308-01	CAP (REEL)	
140	3-356-656-01	SPRING (HEAD PC BOARD), LEAF	
142	X-3356-620-1	LEVER (PINCH LEVER T) ASSY	
144	3-318-433-01	SPRING	
145	* 3-576-977-00	BRACKET, E. HEAD	
147	X-3365-065-1	HOLDER (D9) ASSY, CASSETTE	
148	3-669-596-00	WASHER (2.3), STOPPER	
149	3-356-625-01	SPRING, TENSION	
150	3-356-619-01	SPRING (B), TORSION	
152	3-356-946-01	BUSHING	
153	3-564-121-00	SPRING, COMPRESSION	
154	* 1-608-268-00	ERASE HEAD BOARD	
156	8-719-980-85	DIODE SLF325C	
HE501	1-543-358-11	HEAD, MAGNETIC (ERASE)	
HRP501	1-543-742-11	HEAD MAGNETIC (RECORD/PLAYBACK)	

5-4. MECHANISM SECTION-2 (TCM-200D9)



Ref. No.	Part No.	Description	Remarks
201	X-3362-284-1	FLYWHEEL (S2.3) ASSY	
202	X-3356-619-1	FLYWHEEL (DT) ASSY	
203	3-364-600-01	BELT (CAPSTAN)	
204	X-3362-281-1	CHASSIS (D2.3) ASSY	
205	3-356-705-31	WASHER (CAPSTAN)	
206	3-356-705-21	WASHER (CAPSTAN)	
208	3-355-801-01	SCREW (BTP 2X18)	
209	* 3-356-628-01	SPACER (MOTOR)	
212	3-364-135-01	RETAINER (S), THRUST	
213	3-703-150-11	STOPPER, WIRING	
214	* X-3362-282-1	BRACKET (THRUST RETAINER) ASSY	
215	X-3356-622-1	CHASSIS (C) ASSY, MECHANICAL	
216	3-356-703-01	GEAR (COMMUNICATION C)	
217	3-356-607-01	PULLEY (MODE)	
218	3-356-603-01	BELT (MODE)	
219	3-356-606-01	GEAR (MODE)	
220	3-669-465-11	WASHER (1.5), STOPPER	
221	3-356-702-01	GEAR (COMMUNICATION B)	
222	3-356-605-01	SPRING, COMPRESSION	
223	3-356-609-01	GEAR (LOADING)	

Ref. No.	Part No.	Description	Remarks
224	3-376-854-01	SPRING, TENSION	
225	3-356-653-01	SLIDER (PAUSE)	
226	3-356-616-01	GEAR (LOADING CAM)	
227	* X-3356-606-1	LEVER (LOADING) ASSY	
228	3-356-630-01	ROLLER (LOADING)	
229	3-558-708-11	WASHER, STOPPER	
230	3-356-654-01	GEAR (MODE CAM C)	
231	3-356-617-01	LEVER (SELECTION)	
232	3-356-613-01	LEVER (MODE)	
234	3-356-707-01	SCREW (+PTPWH 2X25)	
235	* X-3356-616-1	BRACKET (MOTOR D) ASSY	
236	3-356-631-01	HOLDOR (SENSOR)	
237	3-363-804-01	SCREW (+P 2.6X6.5)	
238	A-2006-154-A	CAPSTAN C.O.C BOARD, COMPLETE	
239	1-632-779-11	PC BOARD, FG	
240	* 1-632-740-11	MD BOARD	
241	* 1-632-741-11	REAL MOTOR BOARD	
242	* 1-632-746-11	COMPARATOR BOARD	
S1001	1-466-238-11	ENCODER, ROTARY	
M1002	X-3356-604-1	MOTOR (ASSIST) ASSY	
M1001	X-3356-638-1	MOTOR (REEL R) ASSY	
IC1001	8-749-920-97	DIODE GP2S22B	
IC1002	8-749-920-97	DIODE GP2S22B	

SECTION 6
ELECTRICAL PARTS LIST

CAPSTAN C.O.C
COMPARATOR MD

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- −XX, −X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL : metal-film resistor
  METAL OXIDE : Metal Oxide-film resistor
  F : nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example :
  uA... : μA... , uPA... , μPA... , uPB... , μPB... , uPC... , μPC... , uPD..., μPD...
- CAPACITORS :
  uF : μF
- COILS
  uH : μH

Ref. No.	Part No.	Description			Remarks
	A-2006-154-A	CAPSTAN C.O.C BOARD, COMPLETE			
		**********			
	1-216-296-00	METAL CHIP	0	5%	1/8W
		< CAPACITOR >			
C905	1-124-779-00	ELECT CHIP	10uF	20%	16v
C906	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C907	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C908	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C909	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C910	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V
C911	1-124-779-00	ELECT CHIP	10uF	20%	16v
		< DIODE >			
H901	8-719-403-79	DIODE	OH009		
H902	8-719-403-79	DIODE	OH009		
H903	8-719-403-79	DIODE	OH009		
		< IC >			
IC902	8-752-017-40	IC CX20174			
		< RESISTOR >			
R907	1-216-242-00	METAL GLAZE	68K	5%	1/8W
R908	1-216-246-00	METAL GLAZE	100K	5%	1/8W
R909	1-216-246-00	METAL GLAZE	100K	5%	1/8W
R910	1-216-238-00	METAL GLAZE	47K	5%	1/8W
R911	1-216-182-00	METAL GLAZE	220	5%	1/8W
R912	1-216-182-00	METAL GLAZE	220	5%	1/8W
R913	1-216-150-00	METAL GLAZE	10	5%	1/8W
R914	1-216-150-00	METAL GLAZE	10	5%	1/8W
R915	1-216-150-00	METAL GLAZE	10	5%	1/8W
**********					
*	1-632-746-11	COMPARATOR BOARD			
		**********			
		< CAPACITOR >			
C951	1-136-157-00	FILM	0.022uF	5%	50V
C952	1-124-282-00	ELECT	22uF	20%	25V
C953	1-124-478-11	ELECT	100uF	20%	25V
C954	1-124-477-11	ELECT	47uF	20%	25V
C955	1-162-203-31	CERAMIC	15PF	5%	50V
C956	1-162-203-31	CERAMIC	15PF	5%	50V
C957	1-136-159-00	FILM	0.033uF	5%	50V
		< CONNECTOR >			
CN951	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P			
CN952	* 1-564-518-11	PLUG, CONNECTOR 3P			
		< IC >			
IC951	8-759-945-58	IC RC4558P			
IC952	8-759-201-58	IC TC9142P			
		< RESISTOR >			
R951	1-249-413-11	CARBON	470	5%	1/4W
R952	1-249-413-11	CARBON	470	5%	1/4W
R953	1-247-881-00	CARBON	120K	5%	1/4W
R954	1-247-881-00	CARBON	120K	5%	1/4W
R955	1-249-429-11	CARBON	10K	5%	1/4W
R956	1-249-417-11	CARBON	1K	5%	1/4W
R957	1-249-417-11	CARBON	1K	5%	1/4W
R958	1-247-891-00	CARBON	330K	5%	1/4W
R959	1-247-901-11	CARBON	820K	5%	1/4W
R960	1-249-441-11	CARBON	100K	5%	1/4W
		< VIBRATOR >			
X951	1-577-615-11	VIBRATOR, CRYSTAL			
**********					
*	1-632-740-11	MD BOARD			
		********			
	3-356-631-01	HOLDER (SENSOR)			
		< CONNECTOR >			
CN1001	1-506-615-11	PIN, CONNECTOR 9P			
CN1002	1-564-501-11	PIN, CONNECTOR 8P			
		< IC >			
IC1001	8-749-920-97	DIODE	GP2S22B		
IC1002	8-749-920-97	DIODE	GP2S22B		

MD MAIN

Ref. No.	Part No.	Description			Remarks
		< RESISTOR >			
R1001	1-249-408-11	CARBON	180	5%	1/4W
R1002	1-249-408-11	CARBON	180	5%	1/4W
		< SWITCH >			
S1002	1-570-953-11	SWITCH, PUSH (1 KEY)(DOOR)			
S1003	1-571-958-11	SWITCH, PUSH (1 KEY)(CLOSE)			
S1004	1-572-126-11	SWITCH, PUSH (1 KEY)(OPEN)			
S1005	1-572-125-11	SWITCH, LEAF(FWD)			
S1006	1-572-202-11	SWITCH, LEAF(HALF)			
S1007	1-572-125-11	SWITCH, LEAF(METAL)			
S1008	1-572-125-11	SWITCH, LEAF(70μ)			
		< TERMINAL >			
TB1001	* 1-694-018-11	TERMINAL (5P)			

****

	* A-2006-780-A	MAIN BOARD, COMPLATE			
		**********			
		(includin AA)			
	* 1-533-213-31	HOLDER, FUSE			
	* 1-560-242-91	BUS BAR 10P			
	7-682-147-15	SCREW, TR			
	4-902-345-01	HEAT SINK			
	* 3-309-144-21	HEAT SINK			
	* 3-356-925-01	HEAT SINK			
	4-870-539-00	PLATE, GROUND			
	* 4-880-403-11	HEAT SINK			
	7-682-548-09	SCREW +B 3X8			
	7-682-547-04	SCREW +BVTT 3X6 (S)			
		< CAPACITOR >			
C101	1-110-340-11	MYLAR	270PF	5%	50V
C103	1-136-157-00	FILM	0.022uF	5%	50V
C107	1-136-159-00	FILM	0.033uF	5%	50V
C108	1-102-966-00	CERAMIC	43PF	5%	50V
C109	1-130-474-00	MYLAR	0.0018uF	5%	50V
C110	1-130-474-00	MYLAR	0.0018uF	5%	50V
C111	1-130-475-00	MYLAR	0.0022uF	5%	50V
C112	1-130-475-00	MYLAR	0.0022uF	5%	50V
C113	1-130-478-00	MYLAR	0.0039uF	5%	50V
C114	1-136-173-00	FILM	0.47uF	5%	50V
C115	1-136-167-00	FILM	0.15uF	5%	50V
C116	1-136-155-00	FILM	0.015uF	5%	50V
C117	1-124-903-11	ELECT	1uF	20%	50V
C118	1-136-169-00	FILM	0.22uF	5%	50V
C119	1-136-163-00	FILM	0.068uF	5%	50V
C120	1-136-162-00	FILM	0.056uF	5%	50V
C121	1-124-903-11	ELECT	1uF	20%	50V
C122	1-130-480-00	MYLAR	0.0056uF	5%	50V
C123	1-136-153-00	FILM	0.01uF	5%	50V
C125	1-136-165-00	FILM	0.1uF	5%	50V

Ref. No.	Part No.	Description			Remarks
C126	1-123-382-00	ELECT	3.3uF	20%	100V
C171	1-126-049-11	ELECT	22uF	20%	50V
C172	1-126-049-11	ELECT	22uF	20%	50V
C173	1-126-049-11	ELECT	22uF	20%	50V
C174	1-126-049-11	ELECT	22uF	20%	50V
C201	1-110-340-11	MYLAR	270PF	5%	50V
C203	1-136-157-00	FILM	0.022uF	5%	50V
C207	1-136-159-00	FILM	0.033uF	5%	50V
C208	1-102-966-00	CERAMIC	43PF	5%	50V
C209	1-130-474-00	MYLAR	0.0018uF	5%	50V
C210	1-130-474-00	MYLAR	0.0018uF	5%	50V
C211	1-130-475-00	MYLAR	0.0022uF	5%	50V
C212	1-130-475-00	MYLAR	0.0022uF	5%	50V
C213	1-130-478-00	MYLAR	0.0039uF	5%	50V
C214	1-136-173-00	FILM	0.47uF	5%	50V
C215	1-136-167-00	FILM	0.15uF	5%	50V
C216	1-136-155-00	FILM	0.015uF	5%	50V
C217	1-124-903-11	ELECT	1uF	20%	50V
C218	1-136-169-00	FILM	0.22uF	5%	50V
C219	1-136-163-00	FILM	0.068uF	5%	50V
C220	1-136-162-00	FILM	0.056uF	5%	50V
C221	1-124-903-11	ELECT	1uF	20%	50V
C222	1-130-480-00	MYLAR	0.0056uF	5%	50V
C223	1-136-153-00	FILM	0.01uF	5%	50V
C225	1-124-925-11	ELECT	2.2uF	20%	100V
C226	1-123-382-00	ELECT	3.3uF	20%	100V
C271	1-126-049-11	ELECT	22uF	20%	50V
C272	1-126-049-11	ELECT	22uF	20%	50V
C273	1-126-049-11	ELECT	22uF	20%	50V
C274	1-126-049-11	ELECT	22uF	20%	50V
C301	1-126-163-11	ELECT	4.7uF	20%	50V
C302	1-126-163-11	ELECT	4.7uF	20%	50V
C303	1-126-163-11	ELECT	4.7uF	20%	50V
C304	1-130-475-00	MYLAR	0.0022uF	5%	50V
C305	1-130-475-00	MYLAR	0.0022uF	5%	50V
C306	1-130-478-00	MYLAR	0.0039uF	5%	50V
C307	1-136-173-00	FILM	0.47uF	5%	50V
C308	1-136-167-00	FILM	0.15uF	5%	50V
C309	1-136-155-00	FILM	0.015uF	5%	50V
C310	1-124-903-11	ELECT	1uF	20%	50V
C311	1-136-169-00	FILM	0.22uF	5%	50V
C312	1-136-162-00	FILM	0.056uF	5%	50V
C313	1-124-903-11	ELECT	1uF	20%	50V
C314	1-136-163-00	FILM	0.068uF	5%	50V
C315	1-130-480-00	MYLAR	0.0056uF	5%	50V
C316	1-136-153-00	FILM	0.01uF	5%	50V
C317	1-126-059-11	ELECT	10uF	20%	50V
C318	1-126-059-11	ELECT	10uF	20%	50V
C319	1-130-474-00	MYLAR	0.0018uF	5%	50V
C320	1-126-059-11	ELECT	10uF	20%	50V
C321	1-136-161-00	FILM	0.047uF	5%	50V
C322	1-126-049-11	ELECT	22uF	20%	50V
C323	1-110-338-51	MYLAR	180PF	5%	50V
C324	1-136-935-11	FILM	22PF	5%	630V
C325	1-136-155-00	FILM	0.015uF	5%	50V

Ref. No.	Part No.	Description			Remarks
C326	1-136-155-00	FILM	0.015uF	5%	50V
C327	1-136-156-00	FILM	0.018uF	5%	50V
C328	1-136-155-00	FILM	0.015uF	5%	50V
C329	1-136-156-00	FILM	0.018uF	5%	50V
C330	1-136-433-11	FILM	100PF	5%	630V
C331	1-136-803-11	FILM	560PF	5%	630V
C332	1-130-468-00	MYLAR	560PF	5%	50V
C333	1-136-153-00	FILM	0.01uF	5%	50V
C334	1-136-157-00	FILM	0.022uF	5%	50V
C335	1-136-165-00	FILM	0.1uF	5%	50V
C401	1-126-163-11	ELECT	4.7uF	20%	50V
C402	1-126-163-11	ELECT	4.7uF	20%	50V
C403	1-126-163-11	ELECT	4.7uF	20%	50V
C404	1-130-475-00	MYLAR	0.0022uF	5%	50V
C405	1-130-475-00	MYLAR	0.0022uF	5%	50V
C406	1-130-478-00	MYLAR	0.0039uF	5%	50V
C407	1-136-173-00	FILM	0.47uF	5%	50V
C408	1-136-167-00	FILM	0.15uF	5%	50V
C409	1-136-155-00	FILM	0.015uF	5%	50V
C410	1-124-903-11	ELECT	1uF	20%	50V
C411	1-136-169-00	FILM	0.22uF	5%	50V
C412	1-136-162-00	FILM	0.056uF	5%	50V
C413	1-124-903-11	ELECT	1uF	20%	50V
C414	1-136-163-00	FILM	0.068uF	5%	50V
C415	1-130-480-00	MYLAR	0.0056uF	5%	50V
C416	1-136-153-00	FILM	0.01uF	5%	50V
C417	1-126-059-11	ELECT	10uF	20%	50V
C418	1-126-059-11	ELECT	10uF	20%	50V
C419	1-130-474-00	MYLAR	0.0018uF	5%	50V
C420	1-126-059-11	ELECT	10uF	20%	50V
C421	1-136-161-00	FILM	0.047uF	5%	50V
C422	1-126-049-11	ELECT	22uF	20%	50V
C423	1-110-338-51	MYLAR	180PF	5%	50V
C424	1-136-935-11	FILM	22PF	5%	630V
C425	1-136-155-00	FILM	0.015uF	5%	50V
C426	1-136-155-00	FILM	0.015uF	5%	50V
C427	1-136-156-00	FILM	0.018uF	5%	50V
C428	1-136-155-00	FILM	0.015uF	5%	50V
C429	1-136-156-00	FILM	0.018uF	5%	50V
C430	1-136-433-11	FILM	100PF	5%	630V
C431	1-136-803-11	FILM	560PF	5%	630V
C432	1-130-468-00	MYLAR	560PF	5%	50V
C433	1-136-153-00	FILM	0.01uF	5%	50V
C434	1-136-157-00	FILM	0.022uF	5%	50V
C435	1-136-165-00	FILM	0.1uF	5%	50V
C501	1-130-475-00	MYLAR	0.0022uF	5%	50V
C502	1-136-165-00	FILM	0.1uF	5%	50V
C503	1-124-902-00	ELECT	0.47uF	20%	50V
C505	1-124-907-11	ELECT	10uF	20%	50V
C506	1-124-925-11	ELECT	2.2uF	20%	100V
C507	1-124-925-11	ELECT	2.2uF	20%	100V
C508	1-124-477-11	ELECT	47uF	20%	25V
C551	1-136-157-00	FILM	0.022uF	5%	50V
C552	1-136-157-00	FILM	0.022uF	5%	50V
C553	1-130-474-00	MYLAR	0.0018uF	5%	50V

Ref. No.	Part No.	Description			Remarks
C554	1-130-474-00	MYLAR	0.0018uF	5%	50V
C555	1-124-925-11	ELECT	2.2uF	20%	100V
C556	1-136-228-11	FILM	0.0012uF	5%	100V
C557	1-136-233-11	FILM	0.0047uF	5%	100V
C558	1-136-228-11	FILM	0.0012uF	5%	100V
C559	1-124-907-11	ELECT	10uF	20%	50V
C560	1-124-925-11	ELECT	2.2uF	20%	100V
C561	1-136-559-11	FILM	0.0047uF	5%	630V
C562	1-124-907-11	ELECT	10uF	20%	50V
C563	1-107-045-00	MICA	3.9PF		500V
C564	1-126-059-11	ELECT	10uF	20%	50V
C565	1-124-477-11	ELECT	47uF	20%	25V
C591	1-162-282-31	CERAMIC	100PF	10%	50V
C598	1-161-494-00	CERAMIC	0.022uF		25V
C601	1-124-636-00	ELECT	3300uF	20%	25V
C602	1-124-636-00	ELECT	3300uF	20%	25V
C603	1-124-922-11	ELECT	1000uF	20%	63V
C604	1-124-922-11	ELECT	1000uF	20%	63V
C607	1-124-130-00	ELECT	100uF	20%	63V
C701	1-124-887-00	ELECT	3300uF	20%	16V
C702	1-124-471-00	ELECT	1000uF	20%	6.3V
C703	1-124-927-11	ELECT	4.7uF	20%	100V
C704	1-126-105-11	ELECT	1000uF	20%	35V
C705	1-124-473-11	ELECT	1000uF	20%	10V
C706	1-124-927-11	ELECT	4.7uF	20%	100V
C707	1-124-927-11	ELECT	4.7uF	20%	100V
C708	1-126-955-11	ELECT	4700uF	20%	35V
C709	1-124-556-11	ELECT	2200uF	20%	16V
C710	1-124-927-11	ELECT	4.7uF	20%	100V
C711	1-124-122-11	ELECT	100uF	20%	50V
C712	1-124-477-11	ELECT	47uF	20%	25V
C713	1-164-159-11	CERAMIC	0.1uF		50V
C714	1-124-927-11	ELECT	4.7uF	20%	100V
C801	1-124-443-00	ELECT	100uF	20%	10V
C802	1-124-472-11	ELECT	470uF	20%	10V
C803	1-124-477-11	ELECT	47uF	20%	25V
C804	1-124-927-11	ELECT	4.7uF	20%	100V
C805	1-124-907-11	ELECT	10uF	20%	50V
C806	1-164-159-11	CERAMIC	0.1uF		50V
C807	1-164-159-11	CERAMIC	0.1uF		50V

< CONNECTOR >

CN501	*	1-560-062-00	PIN, CONNECTOR 4P
CN502	*	1-564-666-11	PIN, CONNECTOR 10P
CN503	*	1-560-063-00	PIN, CONNECTOR 5P
CN551	*	1-564-510-11	PLUG, CONNECTOR 7P
CN553	*	1-564-507-11	PLUG, CONNECTOR 4P
CN555	*	1-564-509-11	PLUG, CONNECTOR 6P
CN556	*	1-560-062-00	PIN, CONNECTOR 4P
CN557	*	1-560-061-00	PIN, CONNECTOR 3P
CN701	*	1-564-514-11	PLUG, CONNECTOR 11P
CN801	*	1-564-666-11	PIN, CONNECTOR 10P
CN802	*	1-564-342-11	PIN, CONNECTOR 8P
CN803	*	1-564-336-00	PIN, CONNECTOR 2P

Ref. No.	Part No.	Description	Remarks
		< COMPOSITION >	
CP801	1-236-984-11	COMPOSITION CIRCUIT BLOCK	
		< DIODE >	
D101	8-719-987-63	DIODE 1N4148M	
D102	8-719-000-54	DIODE UZL-6L3	
D103	8-719-987-63	DIODE 1N4148M	
D104	8-719-987-63	DIODE 1N4148M	
D201	8-719-987-63	DIODE 1N4148M	
D202	8-719-000-54	DIODE UZL-6L3	
D203	8-719-987-63	DIODE 1N4148M	
D204	8-719-987-63	DIODE 1N4148M	
D501	8-719-987-63	DIODE 1N4148M	
D502	8-719-987-63	DIODE 1N4148M	
D503	8-719-987-63	DIODE 1N4148M	
D504	8-719-987-63	DIODE 1N4148M	
D505	8-719-987-63	DIODE 1N4148M	
D506	8-719-987-63	DIODE 1N4148M	
D507	8-719-987-63	DIODE 1N4148M	
D509	8-719-987-63	DIODE 1N4148M	
D551	8-719-987-63	DIODE 1N4148M	
D552	8-719-987-63	DIODE 1N4148M	
D553	8-719-987-63	DIODE 1N4148M	
D554	8-719-987-63	DIODE 1N4148M	
D555	8-719-987-63	DIODE 1N4148M	
D556	8-719-987-63	DIODE 1N4148M	
D601	8-719-230-02	DIODE 30DF2	
D602	8-719-230-02	DIODE 30DF2	
D603	8-719-230-02	DIODE 30DF2	
D604	8-719-230-02	DIODE 30DF2	
D605	8-719-933-41	DIODE HZS6C3L	
D701	8-719-200-77	DIODE 10E2N	
D702	8-719-200-77	DIODE 10E2N	
D703	8-719-200-77	DIODE 10E2N	
D704	8-719-200-77	DIODE 10E2N	
D705	8-719-200-77	DIODE 10E2N	
D706	8-719-200-77	DIODE 10E2N	
D707	8-719-200-77	DIODE 10E2N	
D708	8-719-933-41	DIODE HZS6C3L	
D712	8-719-933-41	DIODE HZS6C3L	
D713	8-719-001-79	DIODE UZL-12H1	
D714	8-719-015-02	DIODE UZP-8.2BB	
D715	8-719-200-77	DIODE 10E2N	
D716	8-719-987-63	DIODE 1N4148M	
D801	8-719-200-77	DIODE 10E2N	
D802	8-719-987-63	DIODE 1N4148M	
D803	8-719-987-63	DIODE 1N4148M	
		< IC >	
IC501	8-759-602-01	IC M5220P	
IC502	8-752-018-80	IC CX20188	
IC503	8-759-000-49	IC MC14066BCP	
IC504	8-759-945-58	IC RC4558P	
IC505	8-759-634-50	IC M5218AL	
IC506	8-759-634-50	IC M5218AL	
IC507	8-759-634-50	IC M5218AL	
IC551	8-759-945-58	IC RC4558P	
IC552	8-752-018-80	IC CX20188	
IC553	8-759-710-59	IC NJM4580D-D	
IC554	8-759-106-56	IC uPC1297CA	
IC555	8-759-634-50	IC M5218AL	
IC801	8-759-635-69	IC M50964-226SP	
IC802	8-759-973-95	IC BA6219B	
IC803	8-759-822-09	IC LB1641	
		< JACK >	
J501	1-565-320-61	JACK, PIN 6P (CD/LINE)	
		< COIL >	
L101	1-410-778-11	INDUCTOR 18mH	
L201	1-410-778-11	INDUCTOR 18mH	
L301	1-410-771-11	INDUCTOR 4.7mH	
L302	1-410-769-31	INDUCTOR 3.3mH	
L303	1-410-767-11	INDUCTOR 2.2mH	
L304	1-410-780-11	INDUCTOR 27mH	
L401	1-410-771-11	INDUCTOR 4.7mH	
L402	1-410-769-31	INDUCTOR 3.3mH	
L403	1-410-767-11	INDUCTOR 2.2mH	
L404	1-410-780-11	INDUCTOR 27mH	
		< FILTER >	
LPF301	1-236-087-11	FILTER, LOW PASS	
LPF401	1-236-087-11	FILTER, LOW PASS	
		< PILOT LAMP >	
PL551	1-518-471-31	LAMP, PILOT	
PL552	1-518-471-31	LAMP, PILOT	
		< TRANSISTOR >	
Q106	8-729-922-37	TRANSISTOR 2SD2144S	
Q107	8-729-922-37	TRANSISTOR 2SD2144S	
Q108	8-729-922-37	TRANSISTOR 2SD2144S	
Q206	8-729-922-37	TRANSISTOR 2SD2144S	
Q207	8-729-922-37	TRANSISTOR 2SD2144S	
Q208	8-729-922-37	TRANSISTOR 2SD2144S	
Q301	8-729-922-37	TRANSISTOR 2SD2144S	
Q302	8-729-922-37	TRANSISTOR 2SD2144S	
Q303	8-729-922-37	TRANSISTOR 2SD2144S	
Q304	8-729-922-37	TRANSISTOR 2SD2144S	
Q305	8-729-922-37	TRANSISTOR 2SD2144S	
Q401	8-729-922-37	TRANSISTOR 2SD2144S	
Q402	8-729-922-37	TRANSISTOR 2SD2144S	
Q403	8-729-922-37	TRANSISTOR 2SD2144S	
Q404	8-729-922-37	TRANSISTOR 2SD2144S	
Q405	8-729-922-37	TRANSISTOR 2SD2144S	
Q501	8-729-922-37	TRANSISTOR 2SD2144S	
Q502	8-729-922-37	TRANSISTOR 2SD2144S	
Q503	8-729-900-89	TRANSISTOR DTC144ES	
Q504	8-729-900-80	TRANSISTOR DTC114ES	

Ref. No.	Part No.	Description		Remarks
Q505	8-729-900-89	TRANSISTOR	DTC144ES	
Q551	8-729-194-57	TRANSISTOR	2SC945-P	
Q552	8-729-194-57	TRANSISTOR	2SC945-P	
Q553	8-729-281-52	TRANSISTOR	2SC1815-Y	
Q554	8-729-900-80	TRANSISTOR	DTC114ES	
Q555	8-729-900-61	TRANSISTOR	DTA114ES	
Q556	8-729-900-80	TRANSISTOR	DTC114ES	
Q557	8-729-900-80	TRANSISTOR	DTC114ES	
Q558	8-729-900-80	TRANSISTOR	DTC114ES	
Q559	8-729-900-89	TRANSISTOR	DTC144ES	
Q560	8-729-900-89	TRANSISTOR	DTC144ES	
Q601	8-729-141-89	TRANSISTOR	2SD1585-LK	
Q602	8-729-141-83	TRANSISTOR	2SB1094-LK	
Q603	8-729-922-37	TRANSISTOR	2SD2144S	
Q604	8-729-224-62	TRANSISTOR	2SK246-GR	
Q605	8-729-141-32	TRANSISTOR	2SA1409-LK	
Q606	8-729-224-62	TRANSISTOR	2SK246-GR	
Q607	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q611	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q701	8-729-209-15	TRANSISTOR	2SD2012	
Q702	8-729-209-15	TRANSISTOR	2SD2012	
Q703	8-729-209-15	TRANSISTOR	2SD2012	
Q704	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q706	8-729-922-37	TRANSISTOR	2SD2144S	
Q707	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q708	8-729-922-37	TRANSISTOR	2SD2144S	
Q709	8-729-140-04	TRANSISTOR	2SB1116A-L	
Q710	8-729-141-32	TRANSISTOR	2SA1409-LK	
Q801	8-729-900-65	TRANSISTOR	DTA144ES	
Q802	8-729-900-65	TRANSISTOR	DTA144ES	
Q803	8-729-900-65	TRANSISTOR	DTA144ES	
Q804	8-729-900-65	TRANSISTOR	DTA144ES	
Q805	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q806	8-729-900-65	TRANSISTOR	DTA144ES	
Q807	8-729-900-65	TRANSISTOR	DTA144ES	
Q808	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q809	8-729-900-65	TRANSISTOR	DTA144ES	
Q810	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q811	8-729-119-76	TRANSISTOR	2SA1175-HFE	
Q812	8-729-900-61	TRANSISTOR	DTA114ES	
Q813	8-729-620-05	TRANSISTOR	2SC2603-EF	
Q814	8-729-620-05	TRANSISTOR	2SC2603-EF	

< RESISTOR >

R101	1-249-721-11	CARBON	100K	5%	1/2W
R102	1-247-740-11	CARBON	1201	5%	1/2W
R104	1-249-724-91	CARBON	130K	5%	1/2W
R105	1-247-761-11	CARBON	5.6K	5%	1/2W
R113	1-247-717-11	CARBON	2.2K	5%	1/4W
R114	1-247-138-00	CARBON	2K	5%	1/4W
R115	1-247-720-11	CARBON	3.9K	5%	1/4W
R116	1-247-710-11	CARBON	560	5%	1/4W
R117	1-247-725-11	CARBON	10K	5%	1/4W
R118	1-247-719-11	CARBON	3.3K	5%	1/4W
R119	1-247-719-11	CARBON	3.3K	5%	1/4W
R120	1-246-545-00	CARBON	1.0M	5%	1/4W
R121	1-247-710-11	CARBON	560	5%	1/4W
R122	1-249-462-11	CARBON	22K	5%	1/4W
R123	1-247-852-11	CARBON	7.5K	5%	1/4W
R124	1-249-415-11	CARBON	680	5%	1/4W
R125	1-247-854-11	CARBON	9.1K	5%	1/4W
R126	1-249-465-11	CARBON	47K	5%	1/4W
R127	1-249-465-11	CARBON	47K	5%	1/4W
R128	1-249-681-11	CARBON	2.2K	5%	1/2W
R129	1-249-673-11	CARBON	1K	5%	1/2W
R130	1-249-461-11	CARBON	18K	5%	1/4W
R131	1-249-421-11	CARBON	2.2K	5%	1/4W
R132	1-249-429-11	CARBON	10K	5%	1/4W
R133	1-249-433-11	CARBON	22K	5%	1/4W
R134	1-249-417-11	CARBON	1K	5%	1/4W
R135	1-249-437-11	CARBON	47K	5%	1/4W
R136	1-249-427-11	CARBON	6.8K	5%	1/4W
R137	1-249-427-11	CARBON	6.8K	5%	1/4W
R138	1-215-465-00	METAL	68K	1%	1/6W
R139	1-215-448-00	METAL	13K	1%	1/6W
R140	1-215-471-00	METAL	120K	1%	1/6W
R141	1-249-408-11	CARBON	180	5%	1/4W
R142	1-247-883-00	CARBON	150K	5%	1/4W
R143	1-249-429-11	CARBON	10K	5%	1/4W
R201	1-249-721-11	CARBON	100K	5%	1/2W
R202	1-247-740-11	CARBON	120	5%	1/2W
R204	1-249-724-91	CARBON	130K	5%	1/2W
R205	1-247-761-11	CARBON	5.6K	5%	1/2W
R213	1-247-717-11	CARBON	2.2K	5%	1/4W
R214	1-247-138-00	CARBON	2K	5%	1/4W
R215	1-247-720-11	CARBON	3.9K	5%	1/4W
R216	1-247-710-11	CARBON	560	5%	1/4W
R217	1-247-725-11	CARBON	10K	5%	1/4W
R218	1-247-719-11	CARBON	3.3K	5%	1/4W
R219	1-247-719-11	CARBON	3.3K	5%	1/4W
R220	1-246-545-00	CARBON	1.0M	5%	1/4W
R221	1-247-710-11	CARBON	560	5%	1/4W
R222	1-249-462-11	CARBON	22K	5%	1/4W
R223	1-247-852-11	CARBON	7.5K	5%	1/4W
R224	1-249-415-11	CARBON	680	5%	1/4W
R225	1-247-854-11	CARBON	9.1K	5%	1/4W
R226	1-249-465-11	CARBON	47K	5%	1/4W
R227	1-249-465-11	CARBON	47K	5%	1/4W
R228	1-249-681-11	CARBON	2.2K	5%	1/2W
R229	1-249-673-11	CARBON	1K	5%	1/2W
R230	1-249-461-11	CARBON	18K	5%	1/4W
R231	1-249-421-11	CARBON	2.2K	5%	1/4W
R232	1-249-429-11	CARBON	10K	5%	1/4W
R233	1-249-433-11	CARBON	22K	5%	1/4W
R234	1-249-417-11	CARBON	1K	5%	1/4W
R235	1-249-437-11	CARBON	47K	5%	1/4W
R236	1-249-427-11	CARBON	6.8K	5%	1/4W
R237	1-215-441-00	METAL	6.8K	1%	1/6W
R237	1-249-427-11	CARBON	6.8K	5%	1/4W

MAIN

Ref. No.	Part No.	Description			Remarks
R238	1-215-465-00	METAL	68K	1%	1/6W
R239	1-215-448-00	METAL	13K	1%	1/6W
R240	1-215-471-00	METAL	120K	1%	1/6W
R241	1-249-408-11	CARBON	180	5%	1/4W
R242	1-247-883-00	CARBON	150K	5%	1/4W
R243	1-249-429-11	CARBON	10K	5%	1/4W
R301	1-249-703-11	CARBON	18K	5%	1/2W
R302	1-249-490-11	CARBON	27K	5%	1/2W
R303	1-249-469-11	CARBON	100K	5%	1/4W
R304	1-247-723-11	CARBON	6.8K	5%	1/4W
R305	1-247-720-11	CARBON	3.9K	5%	1/4W
R306	1-247-719-11	CARBON	3.3K	5%	1/4W
R307	1-247-152-00	CARBON	7.5K	5%	1/4W
R308	1-249-465-11	CARBON	47K	5%	1/4W
R309	1-249-465-11	CARBON	47K	5%	1/4W
R310	1-247-128-00	CARBON	750	5%	1/4W
R311	1-247-725-11	CARBON	10K	5%	1/4W
R312	1-247-719-11	CARBON	3.3K	5%	1/4W
R313	1-247-719-11	CARBON	3.3K	5%	1/4W
R314	1-246-545-00	CARBON	1.0M	5%	1/4W
R315	1-247-710-11	CARBON	560	5%	1/4W
R316	1-249-462-11	CARBON	22K	5%	1/4W
R317	1-247-854-11	CARBON	9.1K	5%	1/4W
R318	1-247-852-11	CARBON	7.5K	5%	1/4W
R319	1-249-415-11	CARBON	680	5%	1/4W
R320	1-249-462-11	CARBON	22K	5%	1/4W
R321	1-247-719-11	CARBON	3.3K	5%	1/4W
R322	1-247-723-11	CARBON	6.8K	5%	1/4W
R323	1-249-462-11	CARBON	22K	5%	1/4W
R324	1-249-465-11	CARBON	47K	5%	1/4W
R325	1-247-717-11	CARBON	2.2K	5%	1/4W
R326	1-249-469-11	CARBON	100K	5%	1/4W
R327	1-249-593-11	CARBON	51K	5%	1/4W
R328	1-247-721-11	CARBON	4.7K	5%	1/4W
R329	1-247-703-11	CARBON	180	5%	1/4W
R330	1-247-725-11	CARBON	10K	5%	1/4W
R331	1-247-148-00	CARBON	5.1K	5%	1/4W
R332	1-247-701-11	CARBON	120	5%	1/4W
R333	1-247-152-00	CARBON	8.2K	5%	1/4W
R334	1-247-720-11	CARBON	3.9K	5%	1/4W
R334	1-247-721-11	CARBON	4.7K	5%	1/4W
R335	1-247-701-11	CARBON	120	5%	1/4W
R336	1-249-429-11	CARBON	10K	5%	1/4W
R337	1-249-429-11	CARBON	10K	5%	1/4W
R338	1-249-429-11	CARBON	10K	5%	1/4W
R339	1-249-429-11	CARBON	10K	5%	1/4W
R340	1-249-421-11	CARBON	2.2K	5%	1/4W
R341	1-249-604-11	CARBON	150K	5%	1/4W
R342	⚠1-212-857-00	FUSIBLE	10	5%	1/4W F
R343	1-249-435-11	CARBON	33K	5%	1/4W
R344	1-249-426-11	CARBON	5.6K	5%	1/4W
R401	1-249-703-11	CARBON	18K	5%	1/2W
R402	1-249-490-11	CARBON	27K	5%	1/2W
R403	1-249-469-11	CARBON	100K	5%	1/4W
R404	1-247-723-11	CARBON	6.8K	5%	1/4W

Ref. No.	Part No.	Description			Remarks
R405	1-247-720-11	CARBON	3.9K	5%	1/4W
R406	1-247-719-11	CARBON	3.3K	5%	1/4W
R407	1-247-152-00	CARBON	7.5K	5%	1/4W
R408	1-249-465-11	CARBON	47K	5%	1/4W
R409	1-249-465-11	CARBON	47K	5%	1/4W
R410	1-247-128-00	CARBON	750	5%	1/4W
R411	1-247-725-11	CARBON	10K	5%	1/4W
R412	1-247-719-11	CARBON	3.3K	5%	1/4W
R413	1-247-719-11	CARBON	3.3K	5%	1/4W
R414	1-246-545-00	CARBON	1.0M	5%	1/4W
R415	1-247-710-11	CARBON	560	5%	1/4W
R416	1-249-462-11	CARBON	22K	5%	1/4W
R417	1-247-854-11	CARBON	9.1K	5%	1/4W
R418	1-247-852-11	CARBON	7.5K	5%	1/4W
R419	1-249-415-11	CARBON	680	5%	1/4W
R420	1-249-462-11	CARBON	22K	5%	1/4W
R421	1-247-719-11	CARBON	3.3K	5%	1/4W
R422	1-247-723-11	CARBON	6.8K	5%	1/4W
R423	1-249-462-11	CARBON	22K	5%	1/4W
R424	1-249-465-11	CARBON	47K	5%	1/4W
R425	1-247-717-11	CARBON	2.2K	5%	1/4W
R426	1-249-469-11	CARBON	100K	5%	1/4W
R427	1-249-593-11	CARBON	51K	5%	1/4W
R428	1-247-721-11	CARBON	4.7K	5%	1/4W
R429	1-247-703-11	CARBON	180	5%	1/4W
R430	1-247-725-11	CARBON	10K	5%	1/4W
R431	1-247-148-00	CARBON	5.1K	5%	1/4W
R432	1-247-701-11	CARBON	120	5%	1/4W
R433	1-247-152-00	CARBON	8.2K	5%	1/4W
R434	1-247-720-11	CARBON	3.9K	5%	1/4W
R435	1-247-701-11	CARBON	120	5%	1/4W
R436	1-249-429-11	CARBON	10K	5%	1/4W
R437	1-249-429-11	CARBON	10K	5%	1/4W
R438	1-249-429-11	CARBON	10K	5%	1/4W
R439	1-249-429-11	CARBON	10K	5%	1/4W
R440	1-249-421-11	CARBON	2.2K	5%	1/4W
R441	1-249-604-11	CARBON	150K	5%	1/4W
R442	⚠1-212-857-00	FUSIBLE	10	5%	1/4W F
R443	1-249-435-11	CARBON	33K	5%	1/4W
R444	1-249-426-11	CARBON	5.6K	5%	1/4W
R501	1-249-433-11	CARBON	22K	5%	1/4W
R502	1-249-433-11	CARBON	22K	5%	1/4W
R503	1-249-469-11	CARBON	100K	5%	1/4W
R504	1-249-465-11	CARBON	47K	5%	1/4W
R505	1-215-472-00	METAL	130K	1%	1/6W
R506	1-249-437-11	CARBON	47K	5%	1/4W
R507	1-249-433-11	CARBON	22K	5%	1/4W
R508	1-249-417-11	CARBON	1K	5%	1/4W
R509	1-247-885-00	CARBON	180K	5%	1/4W
R510	1-249-433-11	CARBON	22K	5%	1/4W
R511	1-249-413-11	CARBON	470	5%	1/4W
R512	1-249-413-11	CARBON	470	5%	1/4W
R513	1-249-432-11	CARBON	18K	5%	1/4W
R514	1-249-433-11	CARBON	22K	5%	1/4W
R515	1-249-437-11	CARBON	47K	5%	1/4W

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remarks
R516	1-249-437-11	CARBON	47K	5%	1/4W
R517	1-249-437-11	CARBON	47K	5%	1/4W
R518	1-249-429-11	CARBON	10K	5%	1/4W
R519	1-249-429-11	CARBON	10K	5%	1/4W
R520	1-249-437-11	CARBON	47K	5%	1/4W
R521	1-249-429-11	CARBON	10K	5%	1/4W
R522	1-249-437-11	CARBON	47K	5%	1/4W
R523	1-249-421-11	CARBON	2.2K	5%	1/4W
R550	1-215-472-00	METAL	130K	1%	1/6W
R551	1-249-432-11	CARBON	18K	5%	1/4W
R552	1-249-433-11	CARBON	22K	5%	1/4W
R553	1-249-406-11	CARBON	120	5%	1/4W
R554	1-249-432-11	CARBON	18K	5%	1/4W
R555	1-249-397-11	CARBON	22	5%	1/4W
R556	1-247-856-00	CARBON	11K	5%	1/4W
R557	1-249-429-11	CARBON	10K	5%	1/4W
R558	1-249-406-11	CARBON	120	5%	1/4W
R559	1-247-856-00	CARBON	11K	5%	1/4W
R560	1-249-397-11	CARBON	22	5%	1/4W
R561	1-247-887-00	CARBON	220K	5%	1/4W
R562	1-247-887-00	CARBON	220K	5%	1/4W
R563	1-249-407-11	CARBON	150	5%	1/4W
R564	1-249-437-11	CARBON	47K	5%	1/4W
R565	1-249-441-11	CARBON	100K	5%	1/4W
R566	1-249-421-11	CARBON	2.2K	5%	1/4W
R567	1-249-440-11	CARBON	82K	5%	1/4W
R568	1-249-440-11	CARBON	82K	5%	1/4W
R569	⚠1-212-853-00	FUSIBLE	6.8	5%	1/4W F
R570	⚠1-212-853-00	FUSIBLE	6.8	5%	1/4W F
R571	1-249-427-11	CARBON	6.8K	5%	1/4W
R572	1-249-381-11	CARBON	1	5%	1/4W
R573	1-249-421-11	CARBON	2.2K	5%	1/4W
R574	1-249-417-11	CARBON	1K	5%	1/4W
R576	1-249-413-11	CARBON	470	5%	1/4W
R577	1-249-417-11	CARBON	1K	5%	1/4W
R578	1-249-421-11	CARBON	2.2K	5%	1/4W
R603	1-247-717-11	CARBON	2.2K	5%	1/4W
R604	1-247-717-11	CARBON	2.2K	5%	1/4W
R605	1-247-706-11	CARBON	330	5%	1/4W
R606	1-249-556-11	CARBON	1.5K	5%	1/4W
R607	1-249-556-11	CARBON	1.5K	5%	1/4W
R608	1-249-926-11	CARBON	1.3K	5%	1/4W
R609	1-247-717-11	CARBON	2.2K	5%	1/4W
R611	1-247-704-11	CARBON	220	5%	1/4W
R612	1-247-704-11	CARBON	220	5%	1/4W
R701	1-249-421-11	CARBON	2.2K	5%	1/4W
R702	1-249-421-11	CARBON	2.2K	5%	1/4W
R703	1-249-421-11	CARBON	2.2K	5%	1/4W
R704	1-249-425-11	CARBON	4.7K	5%	1/4W
R706	1-249-425-11	CARBON	4.7K	5%	1/4W
R707	1-249-421-11	CARBON	2.2K	5%	1/4W
R708	1-249-421-11	CARBON	2.2K	5%	1/4W
R709	1-249-427-11	CARBON	6.8K	5%	1/4W
R710	1-249-425-11	CARBON	4.7K	5%	1/4W
R711	1-249-431-11	CARBON	15K	5%	1/4W

Ref. No.	Part No.	Description			Remarks
R712	1-249-429-11	CARBON	10K	5%	1/4W
R713	1-249-441-11	CARBON	100K	5%	1/4W
R714	1-249-425-11	CARBON	4.7K	5%	1/4W
R715	1-247-752-11	CARBON	1K	5%	1/2W
R801	1-249-429-11	CARBON	10K	5%	1/4W
R802	1-249-429-11	CARBON	10K	5%	1/4W
R803	1-249-440-11	CARBON	82K	5%	1/4W
R804	1-249-429-11	CARBON	10K	5%	1/4W
R805	1-249-429-11	CARBON	10K	5%	1/4W
R806	1-249-429-11	CARBON	10K	5%	1/4W
R807	1-249-429-11	CARBON	10K	5%	1/4W
R808	1-249-421-11	CARBON	2.2K	5%	1/4W
R809	1-249-421-11	CARBON	2.2K	5%	1/4W
R810	1-249-429-11	CARBON	10K	5%	1/4W
R811	1-249-435-11	CARBON	33K	5%	1/4W
R812	1-249-429-11	CARBON	10K	5%	1/4W
R813	1-249-413-11	CARBON	470	5%	1/4W
R814	1-249-436-11	CARBON	39K	5%	1/4W
R815	1-249-436-11	CARBON	39K	5%	1/4W
R816	1-247-903-00	CARBON	1M	5%	1/4W
R817	1-249-425-11	CARBON	4.7K	5%	1/4W
R818	1-249-417-11	CARBON	1K	5%	1/4W
R819	1-249-435-11	CARBON	33K	5%	1/4W
R820	1-249-437-11	CARBON	47K	5%	1/4W
R821	1-249-484-11	CARBON	6.8	5%	1/2W
R822	1-249-484-11	CARBON	6.8	5%	1/2W
R823	1-247-854-11	CARBON	9.1K	5%	1/4W
R824	1-249-425-11	CARBON	4.7K	5%	1/4W
R825	1-249-425-11	CARBON	4.7K	5%	1/4W
R826	1-249-425-11	CARBON	4.7K	5%	1/4W
R827	1-249-425-11	CARBON	4.7K	5%	1/4W
R828	1-249-426-11	CARBON	5.6K	5%	1/4W
R829	1-249-429-11	CARBON	10K	5%	1/4W
R830	1-249-429-11	CARBON	10K	5%	1/4W
R831	1-249-427-11	CARBON	6.8K	5%	1/4W
R832	1-249-428-11	CARBON	8.2K	5%	1/4W
R833	1-249-429-11	CARBON	10K	5%	1/4W
R834	1-249-429-11	CARBON	10K	5%	1/4W
R835	1-249-413-11	CARBON	470	5%	1/4W

< VARIABLE RESISTOR >

RV101	1-230-504-11	RES, ADJ, METAL 220
RV102	1-238-601-11	RES, ADJ, CARBON 22K
RV201	1-230-504-11	RES, ADJ, METAL 220
RV202	1-238-601-11	RES, ADJ, CARBON 22K
RV301	1-228-993-00	RES, ADJ, METAL 4.7K
RV303	1-238-601-11	RES, ADJ, CARBON 22K
RV401	1-228-993-00	RES, ADJ, METAL 4.7K
RV403	1-238-601-11	RES, ADJ, CARBON 22K
RV551	1-238-595-11	RES, ADJ, CARBON 220
RV552	1-238-595-11	RES, ADJ, CARBON 220
RV553	1-238-599-11	RES, ADJ, CARBON 4.7K
RV554	1-238-601-11	RES, ADJ, CARBON 22K
RV801	1-238-599-11	RES, ADJ, CARBON 4.7K

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MAIN | REEL MOTOR | PANEL

Ref. No.	Part No.	Description				Remarks
		< TRANSFORMER >				
T301	1-433-384-11	TRANSFORMER, BIAS OSCILLATOR				
T401	1-433-384-11	TRANSFORMER, BIAS OSCILLATOR				
T551	1-433-359-11	TRANSFORMER, BIAS OSCILLATION				
		< TEST PIN >				
TP551	* 1-564-505-11	PLUG, CONNECTOR 2P				
TP552	* 1-564-506-11	PLUG, CONNECTOR 3P				
TP553	* 1-564-506-11	PLUG, CONNECTOR 3P				
TP801	* 1-564-506-11	PLUG, CONNECTOR 3P				
		< VIBRATOR >				
X801	1-577-358-21	VIBRATOR, CERAMIC (4MHz)				
**********						
	* 1-632-741-11	REEL MOTOR BOARD				
		**********				
		< CAPACITOR >				
C1051	1-124-907-11	ELECT	10uF	20%	50V	
C1052	1-124-907-11	ELECT	10uF	20%	50V	
C1053	1-164-159-11	CERAMIC	0.1uF		50V	
		< CONNECTOR >				
CN1051	* 1-564-499-11	PIN, CONNECTOR 6P				
CN1052	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P				
CN1053	* 1-564-718-11	PIN, CONNECTOR (SMALL TYPE) 2P				
		< RESISTOR >				
R1051	1-249-412-11	CARBON	390	5%	1/4W	
**********						
	* A-2006-781-A	PANEL BOARD, COMPLETE				
		**********				
		(includink ●A-G)				
		< CAPACITOR >				
C001	1-161-744-00	CERAMIC	0.01uF		400V	
C181	1-126-059-11	ELECT	10uF	20%	50V	
C281	1-126-059-11	ELECT	10uF	20%	50V	
C341	1-130-473-00	MYLAR	0.0015uF	5%	50V	
C342	1-130-471-00	MYLAR	0.001uF	5%	50V	
C441	1-130-473-00	MYLAR	0.0015uF	5%	50V	
C442	1-130-471-00	MYLAR	0.001uF	5%	50V	
C541	1-123-369-00	ELECT	4.7uF	20%	50V	
C542	1-123-369-00	ELECT	4.7uF	20%	50V	
C597	1-161-494-00	CERAMIC	0.022uF		25V	
C901	1-126-177-11	ELECT	100uF	20%	10V	
		< CONNECTOR >				
CN001	* 1-568-226-11	PIN, CONNECTOR 2P				
CN002	1-568-226-11	PIN, CONNECTOR 2P				

Ref. No.	Part No.	Description	Remarks
CN521	* 1-564-521-11	PLUG, CONNECTOR 6P	
CN543	* 1-560-070-00	BASE POST 5P	
CN591	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN592	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN593	* 1-564-519-11	PLUG, CONNECTOR 4P	
CN901	* 1-564-336-00	PIN, CONNECTOR 2P	
		< COMPOSITION >	
CP901	1-232-881-11	COMPOSITION CIRCUIT BLOCK	
CP902	1-232-881-11	COMPOSITION CIRCUIT BLOCK	
CP903	1-236-985-11	COMPOSITION CIRCUIT BLOCK	
		< DIODE >	
D901	8-719-987-63	DIODE 1N4148M	
D902	8-719-987-63	DIODE 1N4148M	
D903	8-719-933-57	DIODE HZS9B2L	
D904	8-719-987-63	DIODE 1N4148M	
D905	8-719-987-63	DIODE 1N4148M	
D906	8-719-987-63	DIODE 1N4148M	
D907	8-719-987-63	DIODE 1N4148M	
D908	8-719-987-63	DIODE 1N4148M	
D909	8-719-987-63	DIODE 1N4148M	
D910	8-719-987-63	DIODE 1N4148M	
D911	8-719-987-63	DIODE 1N4148M	
D912	8-719-302-46	DIODE SEL1210S-C(REC)	
D913	8-719-302-45	DIODE SEL1210S (▲)	
D914	8-719-302-79	DIODE SEL1910A-C (PAUSE)	
		< FILTER >	
FLT901	1-519-560-21	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC541	8-759-634-51	IC M5218AP	
IC901	8-759-635-68	IC M50940-313SP	
IC902	8-741-100-48	IC SBX1610-59	
		< JACK >	
J541	1-507-796-71	JACK (HEADPHONES)	
		< TRANSISTOR >	
Q901	8-729-115-28	TRANSISTOR BN1L3Z-K	
Q902	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q903	8-729-900-61	TRANSISTOR DTA114ES	
Q904	8-729-900-61	TRANSISTOR DTA114ES	
Q905	8-729-900-61	TRANSISTOR DTA114ES	
Q906	8-729-900-61	TRANSISTOR DTA114ES	
Q907	8-729-900-65	TRANSISTOR DTA144ES	
Q908	8-729-900-65	TRANSISTOR DTA144ES	
Q909	8-729-900-65	TRANSISTOR DTA144ES	
Q910	8-729-900-65	TRANSISTOR DTA144ES	
Q911	8-729-900-89	TRANSISTOR DTC144ES	
Q912	8-729-900-65	TRANSISTOR DTA144ES	
Q913	8-729-900-65	TRANSISTOR DTA144ES	
Q914	8-729-900-65	TRANSISTOR DTA144ES	

Ref. No.	Part No.	Description			Remarks
Q915	8-729-900-89	TRANSISTOR	DTC144ES		
Q916	8-729-900-65	TRANSISTOR	DTA144ES		
Q917	8-729-900-65	TRANSISTOR	DTA144ES		
Q918	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q919	8-729-900-65	TRANSISTOR	DTA144ES		
		< RESISTOR >			
R001	1-247-752-11	CARBON	1K	5% 1/2W	
R181	1-249-429-11	CARBON	10K	5% 1/4W	
R182	1-249-433-11	CARBON	22K	5% 1/4W	
R183	1-249-423-11	CARBON	3.3K	5% 1/4W	
R184	1-247-704-11	CARBON	220	5% 1/4W	
R281	1-249-429-11	CARBON	10K	5% 1/4W	
R282	1-249-434-11	CARBON	27K	5% 1/4W	
R283	1-249-423-11	CARBON	3.3K	5% 1/4W	
R284	1-247-704-11	CARBON	220	5% 1/4W	
R381	1-247-721-11	CARBON	4.7K	5% 1/4W	
R382	1-247-152-00	CARBON	8.2K	5% 1/4W	
R383	1-247-725-11	CARBON	10K	5% 1/4W	
R384	1-247-721-11	CARBON	4.7K	5% 1/4W	
R385	1-246-545-00	CARBON	1.0M	5% 1/4W	
R386	1-249-462-11	CARBON	22K	5% 1/4W	
R481	1-247-721-11	CARBON	4.7K	5% 1/4W	
R482	1-247-152-00	CARBON	8.2K	5% 1/4W	
R483	1-247-725-11	CARBON	10K	5% 1/4W	
R484	1-247-721-11	CARBON	4.7K	5% 1/4W	
R485	1-246-545-00	CARBON	1.0M	5% 1/4W	
R486	1-249-462-11	CARBON	22K	5% 1/4W	
R590	1-249-429-11	CARBON	10K	5% 1/4W	
R881	1-249-434-11	CARBON	27K	5% 1/4W	
R882	1-249-431-11	CARBON	15K	5% 1/4W	
R901	1-249-421-11	CARBON	2.2K	5% 1/4W	
R902	1-249-421-11	CARBON	2.2K	5% 1/4W	
R903	1-247-895-00	CARBON	470K	5% 1/4W	
R904	1-249-433-11	CARBON	22K	5% 1/4W	
R905	1-249-433-11	CARBON	22K	5% 1/4W	
R906	1-249-429-11	CARBON	10K	5% 1/4W	
R907	1-249-425-11	CARBON	4.7K	5% 1/4W	
R908	1-249-431-11	CARBON	15K	5% 1/4W	
R909	1-249-422-11	CARBON	2.7K	5% 1/4W	
R910	1-249-424-11	CARBON	3.9K	5% 1/4W	
R911	1-249-428-11	CARBON	8.2K	5% 1/4W	
R912	1-249-434-11	CARBON	27K	5% 1/4W	
R913	1-249-422-11	CARBON	2.7K	5% 1/4W	
R914	1-249-424-11	CARBON	3.9K	5% 1/4W	
R915	1-249-428-11	CARBON	8.2K	5% 1/4W	
R916	1-249-434-11	CARBON	27K	5% 1/4W	
R917	1-249-431-11	CARBON	15K	5% 1/4W	
R918	1-249-409-11	CARBON	220	5% 1/4W	
R919	1-249-410-11	CARBON	270	5% 1/4W	
R920	1-249-412-11	CARBON	390	5% 1/4W	
R921	1-249-421-11	CARBON	2.2K	5% 1/4W	
R922	1-249-421-11	CARBON	2.2K	5% 1/4W	
R923	1-247-903-00	CARBON	1M	5% 1/4W	

Ref. No.	Part No.	Description			Remarks
R925	1-249-425-11	CARBON	4.7K	5% 1/4W	
R926	1-249-441-11	CARBON	100K	5% 1/4W	
R927	1-249-441-11	CARBON	100K	5% 1/4W	
R928	1-249-441-11	CARBON	100K	5% 1/4W	
R929	1-249-433-11	CARBON	22K	5% 1/4W	
R930	1-249-441-11	CARBON	100K	5% 1/4W	
R931	1-249-425-11	CARBON	4.7K	5% 1/4W	
		< VARIABLE RESISTOR >			
RV541	1-241-330-11	RES, VAR, CARBON 20K/20K (PHONE LEVEL)			
RV591	1-238-833-21	RES, VAR, CARBON 20K/20K (REC LEVEL)			
RV592	1-238-687-11	RES, VAR, CARBON 50K/50K (BALANCE)			
RV593	1-241-329-11	RES, VAR, CARBON 5K/5K (REC LEVEL)			
RV594	1-241-328-11	RES, VAR, CARBON 10K/10K (BIAS)			
		< SWITCH >			
S541	1-572-583-11	SWITCH, ROTARY (DOLBY NR)			
S542	1-572-764-11	SWITCH, PUSH (2 KEY) (CALIBRATION /MPX FILTER)			
S591	1-572-153-11	SWITCH, PUSH (1 KEY) (INPUT. CD DELECT /LINE)			
S592	1-572-582-11	SWITCH, ROTARY (REC EQ CAL)			
S701	1-572-267-51	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)			
S801	1-572-268-11	SWITCH, SLIDE (TIMER)			
S901	1-554-303-21	SWITCH, TACTILE (COUNTER. MEMORY)			
S902	1-554-303-21	SWITCH, TACTILE (COUNTER. RESET)			
S903	1-554-303-21	SWITCH, TACTILE (DISPLAY MODE)			
S904	1-554-303-21	SWITCH, TACTILE (OPEN/CLOSE)			
S905	1-554-303-21	SWITCH, TACTILE (■)			
S906	1-554-303-21	SWITCH, TACTILE (◀◀)			
S907	1-554-303-21	SWITCH, TACTILE (▶▶)			
S908	1-554-303-21	SWITCH, TACTILE (REC)			
S909	1-554-303-21	SWITCH, TACTILE (▶)			
S910	1-554-303-21	SWITCH, TACTILE (PAUSE)			
S911	1-554-303-21	SWITCH, TACTILE (⏮)			
S912	1-554-303-21	SWITCH, TACTILE (⏭)			
S913	1-554-303-21	SWITCH, TACTILE (REC MUTE)			
S914	1-554-303-21	SWITCH, TACTILE (MONITOR)			
		< VIBRATOR >			
X901	1-577-358-21	VIBRATOR, CERAMIC (4MHz)			

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MISCELLANEOUS

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156	8-719-980-85	DIODE SLF325C
239	1-632-779-11	PC BOARD, FG
5	♯ 1-590-321-51	LEAD (WITH CONNECTOR)
CNP701	⚠1-575-651-11	CORD, POWER
F801	⚠1-532-285-00	FUSE, TIME-LAG (1.25A)
M1001	X-3356-638-1	MOTOR (REEL R) ASSY
M1002	X-3356-604-1	MOTOR (ASSIST) ASSY
S1001	1-466-238-11	ENCODER, ROTARY
T701	⚠1-450-856-11	TRANSFORMER, POWER

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-558-271-11	CORD, CONNECTION	
*	3-363-900-01	CUSHION	
*	3-376-746-01	INDIVIDUAL CARTON	
	3-755-112-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH/SPANISH/PORTUGUESE) (AEP)	
	3-755-112-41	MANUAL, INSTRUCTION (GERMAN/DUTCH/SWEDISH/ITALIAN) (AEP)	
	3-755-112-51	MANUAL, INSTRUCTION (GERMAN) (G)	

Ref. No.	Part No.	Description	Remarks
		HARDWARE LIST	
		**********	
#1	7-682-547-09	SCREW +BV 3X6, S TIGHT	
#2	7-685-133-19	SCREW +BTP 2.6X6 TYPE2 N-S	
#3	7-682-547-04	SCREW +BVTT 3X6 (S)	
#5	7-682-548-04	SCREW +BVTT 3X8 (S)	
#6	7-682-548-09	SCREW +BVTT 3X8 (S)	
#7	7-682-147-15	SCREW, TR	
#8	7-682-548-09	SCREW +B 3X8	
#9	7-682-547-04	SCREW +BVTT 3X6 (S)	
#10	7-621-849-00	SCREW (BV/RING)	
#11	7-628-253-00	SCREW +PS 2X4	
#12	7-628-254-10	SCREW +PS 2.6X6	
#13	7-671-154-01	STENLESS BALL	
#14	7-682-648-09	SCREW +PS 3X8	
#16	7-621-255-20	SCREW +BVTT 2X4 (S)	
#17	7-621-255-35	SCREW +BVTT 2X5 (S)	
#18	7-685-870-01	SCREW +BVTT 3X5 (S)	
#20	7-621-772-70	SCREW +B 2X14	
#21	7-622-205-05	NUT M2 TYPE2	
#22	7-621-775-10	SCREW +B 2.6X4	
#23	7-685-533-19	SCREW +BV 2.6X8 TAPPING	

9-957-055-11

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